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ABSTRACT

Findings from a study of 27 superintendents, 39 principals, and 37 supervisors recognized as effective leaders in Tennessee schools suggest that the highest level of educational leadership is dominated by individuals whose cognitive style is ineffective for conceptualizing the future. Analysis of the subjects' brain dominance patterns using the Herrmann Brain Dominance Instrument and of the subjects' management skills according to the Katz ranking system indicated that many superintendents have difficulty moving beyond the analytical and technical aspects of their positions. These administrator characteristics contrast with the leadership qualities identified in the literature as effective. Principals and supervisors showed a better balance between their analytical skills and their conceptual modes of thought, indicating less dominance by the brain's left hemisphere. Women, best represented among the supervisors, showed better balance than did men. The researchers also administered a questionnaire measuring attitudes and efforts toward innovation. Principals scored highest on this questionnaire, perhaps because they were better positioned to implement their ideas than were supervisors. This report begins with a literature review covering and integrating brain research, leadership research, and educational change studies. The findings of the present study are then discussed and administrative levels compared. The study includes an extensive list of references, and three appendixes present the instruments used. (PGD)

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A DISCUSSION OF BRAIN HEMISPHERE CHARACTERISTICS AND CREATIVE LEADERSHIP AMONG SELECTED EDUCATIONAL ADMINISTRATORS IN TENNESSEE

Presented to the
American Association of School
Administrators Convention
Dallas, Texas, March 9, 1985*

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*Excerpts from a complete dissertation presented for the Doctor of Education Degree, The University of Tennesssee, Knoxville, August, 1984.

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Foreward

> He who cannot change the very fabric of his thought, will never be able to change reality and will never therefore make any progress.....change should take place first at a deeper and perhaps subtler level than the conscious level.
>
> Ohmar Sedat

This study is an investigation of the thought processes of today's educational leaders. It addresses not only the nature of leadership thought patterns but provides a rationale for the necessity for change. The paper prepared for this presentation is a condensed version of a complete dissertation by the author. The original work is on file with the American Association of School Administrators.

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I. INTRODUCTION TO THE STUDY

Our educational system stands at the threshold of needed change. Evidence of this need is seen in: public demands for accountability, technological advancement, budget reductions, cultural diversity and a self-aware work force demanding its right to "mean something" within the organization.

Dyer and Dyer (1965) suggest that leadership reflects a society's expectations. While the traditional maintenance style administrator may have been a "genius sui generis" in prior days, such a style is incompatible with an evolving questioning age. Traditional values ingrained through an educational bureaucracy will no longer provide the answers needed to shape our future destiny.

Educational leadership must develop a new perspective: one that is visionary, intuitive and human resource oriented. If educators are to bring about the ultimate changes so crucial to the survival of the system, they may first find it necessary to change the nature of their thought processes. Much of what they discover as they seek to change may be found outside the conscious thought processes termed rationality and in the subconscious realm of intutition. Such is the focus of this study.

Purpose

The purpose of this exploratory study was to investigate the administrative leadership styles prevalent among current leaders at various leadership levels within the public schools of Tennessee. Leaders selected for study were those judged by a professional panel of experts to be among the most effective in the state. The leadership styles of the administrators were viewed against a background of current brain research in an effort to discover underlying patterns of cognitive processing. Such an investigation allowed for speculation of not only where leaders are in their thought processes but where they need to be.

Certain paired qualities of leadership which are opposite in nature and at the same time equally essential to leadership effectiveness were explored against patterns of brain hemisphere dominance. These leadership pairs included: analysis vs. conceptualization; intuition vs. logic; creativity vs. maintanence; task vs relationship; and stability vs. flexibility.

This study demonstrated that though the components in each pair are essential to leadership, it is only as the pair is fused that leadership can be considered truly creative. Such a combining of opposite qualities reflects the underlying concept of creative thought referred to by Arietti (1976) as the "Magic Synthesis."

Procedures

The study was developed according to the following design: superintendents, principals, and supervisors were selected by expert nominators as being effective leaders in their respective positions. Each was ranked according to the Katz skills of management (i.e., technical, human, conceptual) which they most vividly displayed. All subjected completed: 1) a self-report measurement of brain hemisphere dominance, The Herrmann Brain Dominance Instrument and 2) a researcher developed questionnaire designed to assess the perceived innovation displayed by each leader (See Appendix A and B). A composite picture was formulated of each administrative group based on results of this instrumentation.

A total of 115 subjects took part in the study. Subjects included: 27 nominated superintendents, 39 principals, 37 supervisors and 12 random sample superintendents. The random sample was selected from among the remaining superintendents in the state in an effort to support the nomination process and lend credence to the validity of the questionnaire.

Instrumentation/Brain Dominance

The test chosen to determine the brain dominance of the subjects in this study was the Herrmann Brain Dominance Instrument, a paper/pencil self-report instrument which provided a "three dimensional analysis of dominance in both the cerebral (frontal) and lower (the region nearer the limbic brain) hemisphere areas" (Brain/Mind Bulletin, 1981:2). This design enabled the measurement of dominance in the separate hemispheres along two different planes. The

arrangement consisted of the following quadrants:

Cerebral Left: the analytical, logical, problem-solving person.
Lower Left: the reliable, organized, controlling conservative person.
Cerebral Right: the creative, conceptual, synthesizing person.
Lower Right: the interpersonal, emotional, sensitive, musical person. (Mind/Brain Bulletin, 1981:2)

Each quadrant of the Herrmann Instrument received a dominance score of: 1 (signifying primary dominance), 2 (signifying secondary dominance), or 3 (indicating minimal use). These scores were assigned on the basis of the scaled score cut-off points for each quadrant:

Scaled Score	Dominance Score
67-100	1
34-66	2
2-33	3

Appendix A contains predominant dominance codes, clusters and score sheets.

Instrumentation/Innovation

The Perceived Innovation Questionnaire, built from recent research related to leadership and change was designed by the researcher to assess perceived innovation by asking respondents to report their perceived quantitative aspects of their own influence on innovation or change. Questionnaire items related to four general areas: (1) innovation in current position, (2) involvement of others in innovation and new directions, (3) innovative tone in personality, and (4) implementation of change.

Much of the questionnaire was based on the notion of quantity as one means of determining the degree of change to which one felt he/she had contributed. The concept of significant change was introduced and defined with subjects requested to rate numerically the number of significant changes they personally introduced, as well as the number which occurred as the direct result of the ideas and work of their subordinates.

Leaders indicated areas which, under their perceived leadership, had undergone significant change during the preceding five-year period and rated the degree of each change according to a scale of 0-3. This information was requested to gain a measurement of perceived innovation within the environment of the leader as a result of the leadership displayed.

Rank values were determined for each question based on an averaging of the responses from an item analysis. Each question was assigned a particular value of High (3 points), Flexible (2 points) or Moderate (1 point). Each subject received a total score. Respondents were classified into one of the following groups: High = 185+, Medium = 156-184, and Low = 155 or less. (See Appendix B).

Problems of Instrumentation

The problem of measuring innovativeness was a major difficulty in this study. The results gleaned from the method chosen are subject to the personal perceptions of the subject's own input into the change process. Likewise, the instrument leans heavily upon the quantity of change rather than the quality produced.

In retrospect, this component of the study could have been strengthened by adding features such as: personal portfolios, interviews, peer evaluations and superordinate recommendations. The widespread nature of the sample, the time factor involved in the collection of the data and the economic considerations of a one-to-one evaluation procedure, made such approaches prohibitive.

Introduction to Literature Review

In developing a complete understanding of the nature of this study it is essential to explore some of the major concepts from the literature reviews of brain research, creative leadership and educational change. Against that background a presentation of the data will be submitted. These findings will provide the basis for conclusions and/or applications for today's superintendent.

1. Brain Research

Real progress in the area of brain research began in the 1950's with the split brain experiments of Roger Sperry. Sperry's work demonstrated that the corpus callosum was a unifying fiber which not only separated and held the two brain hemispheres together but provided a communication network as well. Such knowledge allowed researchers to confirm the previous theories of the duality of man's thinking and established that the human brain did indeed contain "two minds in one" (Sperry, 1964:42).

Sperry's studies revealed that information received through the body's left sensory field is recieved and interpreted by the brain's right hemisphere. In like manner the left hemisphere recieves and processes information from the right sensory field. Figure 1 demonstrates this process.

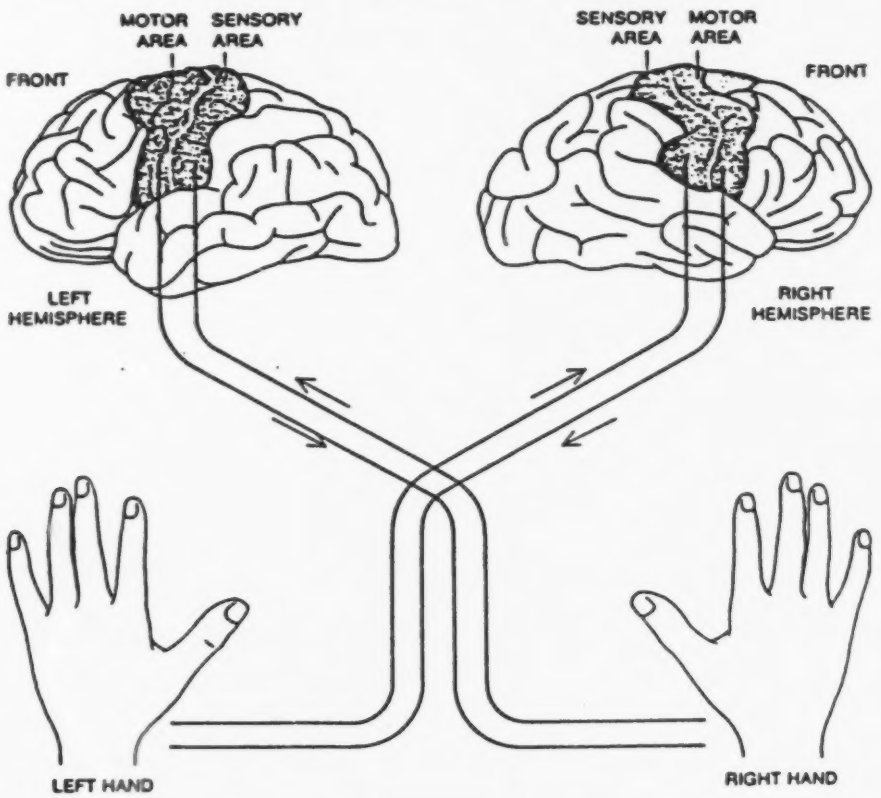

Figure 1: Motor and Sensory Pathways.

Source: Doreen Kimura, "The Asymetry of the Human Brain," Scientific American, Vol. 228, No. 3, 1978, p. 76.

Through the incorporation of extensive sensory-processing tests, Levy (1981) an associate of Sperry's, demonstrated that the hemispheres are selective in the type of information which they process most readily. Her experiments demonstrated that (1) the left hemisphere was more adept at verbal tasks incorporating an analytical style of thinking (2) the right hemisphere was superior in visuo-spatial tasks incorporating a synthesis or bolistic approach in cognitive style. Such patterns of thought result in certain qualities being more characteristic of a particular hemisphere as shown in Figure 2.

HEMISPHERIC DOMINANCE

CLINICAL AND EXPERIMENTAL EVIDENCE

LEFT HEMISPHERE	RIGHT HEMISPHERE
(RIGHT SIDE OF BODY)	(LEFT SIDE OF BODY)
SPEECH / VERBAL	SPATIAL / MUSICAL
LOGICAL, MATHEMATICAL	HOLISTIC
LINEAR, DETAILED	ARTISTIC, SYMBOLIC
SEQUENTIAL	SIMULTANEOUS
CONTROLLED	EMOTIONAL
INTELLECTUAL	INTUITIVE, CREATIVE
DOMINANT	MINOR (QUITE)
WORLDLY	SPIRITUAL
ACTIVE	RECEPTIVE
ANALYTIC	SYNTHETIC, GESTALT
READING, WRITING, NAMING	FACIAL RECOGNITION
SEQUENTIAL ORDERING	SIMULTANEOUS COMPREHENSION
PERCEPTION OF SIGNIFICANT ORDER	PERCEPTION OF ABSTRACT PATTERNS
COMPLEX MOTOR SEQUENCES	RECOGNITION OF COMPLEX FIGURES

Figure 2: Hemisphereic Dominance

Source: Robert J. Trotter, "The Other Hemisphere," Science News, April 3, 1976, Vol. 109 (4), p.219

Since the late 1960's and early 70's the focus of brain research has been to examine more closely the nature of these respective thought processes rather than to emphasize the localization of specific tasks. Even though specific tasks may be directed to either hemisphere, there is a tendancy for an individual to develop a style of cognitive processing in which one hemisphere usually is dominant. In other words, the dominant hemisphere tends to approach the problem solving according to the nature of that hemispheric style regardless of the nature of the task (Levy, 1980). As Levy states:

> Even among individuals having well-lateralized brains in the typical direction, the tendency of one or the other hemispheres to dominate affective responses, cognitive processing, and behavioral control is correlated with variations in personality structure (p. 259).

How this sensory information is intergrated and directed is determined by the integrating functions of the corpus callosum as well as by other sub-cortical connections. In understanding these sub-cortical connections it is necessary to review aspects of the truine brain.

Truine Brain

Restak (1979:164-206) described the human brain as an interrelated model making it impossible to completely isolate functions as being merely right or left-brained. The brain, because of it dynamic nature is both localized and holistic. Organization of the human brain is set in the lower sections even before reaching the more sophisticated regions of the neo-cortex. There is a constant interrelatedness among all parts of the brain made possible not only through the corpus callosum but also through the subcortal connections in regions of the brain underlying the neo-cortex.

The knowledge of this unifying system and of the underlying regions of the brain we owe to the work of McLean, (1978) who during the 1950's discovered what he termed the "truine brain." According to McLean, man has, through an evolutionary process, developed three brains in one; each part contributes to the total thought process through the brain's interrelated pathways.

McLean labeled the three parts of the truine brain: (1) R Complex or Reptilian Brain (2) The Limbic System and (3) The Neo-Cortex (See Figure 3 for a diagram of the relationship of these three separate brain areas). The Reptilian Brain, the oldest and most primitive brain, is inhibited somewhat by more dominant parts of the brain but still operates to maintain protection. It is primarily concerned with safekeeping aspects of our behavior such as maintaining the status quo.

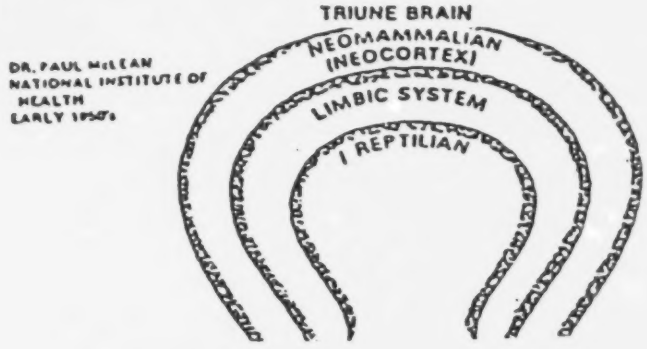

Figure 3: The Truine Brain

Source: Ned Herrmann. Materials presented at Application Workshop, Hermann Dominance Instrument, Lake Lure, North Carolina, February, 1983.

The limbic system is situated at the base of both cerebral hemispheres. Herrmann (1982) theorizes that the left limbic hemisphere controls our planning and organizational activities through the structure and control which it contributes to our thinking. The right hemisphere of the Limbic System is the seat of our emotional activity and colors much of our emotional response through its connection with the right hemisphere.

This assumption formed the basis for Herrmann's "quadrant view" of the brain and the resulting brain dominance patterns (See Figure 4 for a graphic representation of this theory).

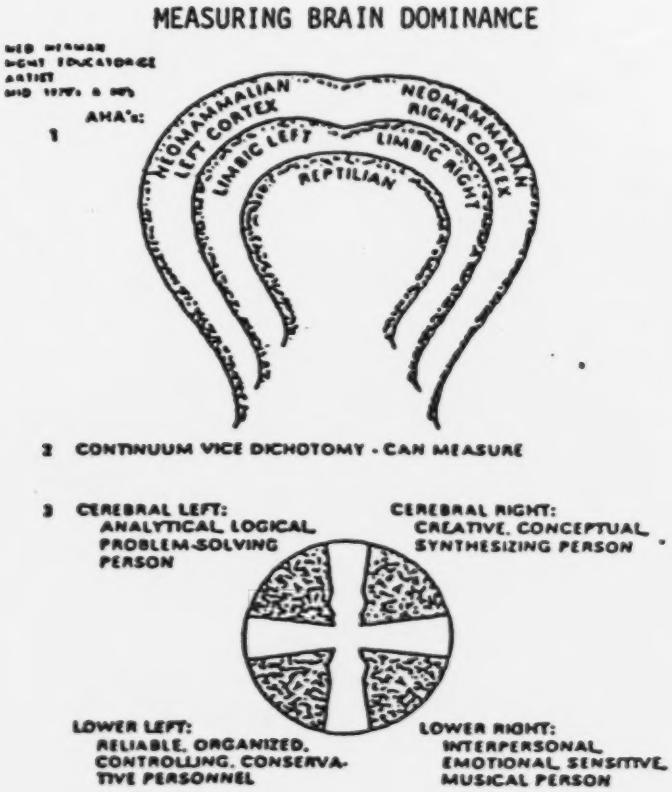

Figure 4: Measuring Brain Dominance

Source: Ned Herrmann. Materials presented at Application Workshop, Herrmann Brain Dominance Instrument, Lake Lure, North Carolina, February, 1983.

Herrmann theorized that brain dominance can be a result of greater focus in one of four areas of the brain (or combinations of areas). Two quadrants, as proposed by Herrmann, are more cerebral signifying a greater reliance on the neo-cortex. The remaining two lean heavily upon the earlier brain formations of the limbic system which tend to operate from an emotional or status quo frame of reference. Herrmann's theory is reminiscent of earlier work by Carl Jung (1923) who espoused the "thinking" vs. "feeling" aspects of formulating judgements.

Thinking and sensing modes bear striking resemblance to the left hemisphere processes as defined by current research. Feeling and intuitive modes, in similar fashion, are patterned after right hemisphere style (Myers and Myers, 1980:272). Any person, according to Jung, may possess all four of the cognitive functions to a degree; however, one is typically more dominant than the others.

Herrmann (1980) likewise theorized that brain dominance can be a result of greater focus in one of four areas of the brain (or combinations of areas). Two quadrants, as proposed by Herrmann, are more cerebral signifying a greater reliance on the neo-cortex or thinking processes. The remaining two lean heavily upon the earlier brain formations of the limbic and reptilian systems which tend to operate from an emotional or status quo frame of reference. They are more feeling in the nature of their thought process. Herrmann stresses that man uses all aspects of these quadrants but leans more toward the use of some than others, hence man's dominance pattern or style of cognitive processing emerges.

He suggests that dominance should be considered a continuim with shifts between the hemispheres being in the nature of primary and secondary relationships. He states:

> "For the greater majority of individuals in this culture, there would be a brain dominance condition in which the two hemispheres would be working together, but with <u>one taking the lead</u>" (Herrmann: 1982, p. 8).

How do these previously stated relationships, uncovered through recent brain research, present themselves in the area of leadership? More importantly how are they reflected as manifestations of an innovative style in which change is fully implemented? These questions form the basis of the reminder of this literature review.

II. CREATIVE LEADERSHIP

Leadership, as defined in this study, is the ability to bring about constructive change. Such leadership is innovative and demands of the leader a capacity to conceptualize the creation of new avenues for change, as well as an intuitive awareness in working with and through people to move an organization forward.

Levitt (1981) in relating the field of management to the creative thought process, separates the creative element into two factors: creativity and innovation. He explains that: "Creativity is thinking up new things. Innovation is doing new things." He states:

> The scarce people are the ones who have the know-how energy, daring and staying power to implement ideas. . . .Since business is a "get thing done" institution, creativity without action oriented follow-through is a barren form of behavior. In a sense, it is irresponsible" (p. 96).

The person who can, in fact, combine creativity and innovation, who utilizes both left and right hemispheric thinking, is a creative leader. Creative leadership demands that the leader endeavor to operate from a "whole brained" perspective by incorporating the full power of both cognitive processes. A leader demonstrates this ability by successfully combining the following paradoxical qualities: (1) analysis vs. conceptualization, (2) intuition vs. logic, (3) creativity vs. maintenance, (4) relationship vs. task and (4) flexibility vs. stability.

Analysis vs. Conceptualization

The embodiment of purpose through the leadership process requires that the leader possess the ability to sense organizational needs from a holistic approach and that he/she have an insightfulness or intuitive feel for what the organization can become. Greenleaf (1977) defines such an ability as the mark of leadership; Katz (1974) considers it the most important of all leadership skills at the top level of administration.

Suojanen (1976) suggests that visionary ability, or conceptual skill, is a result of the thinking process characterized by the right brain. The intergration of the concept and the implication of a strategy, however, are dependent upon the complimentary incorporation of the left-brain process of analysis and judgement. He explains:

> It is clear that the truly creative individual is one in whom a balance exists between the cerebral hemispheres . . . Serendipity then is a symbiosis of the Gestalt of the RHB and the analytical functioning of the LHB out of which new knowledge emerges (p. 23).

In his model of hemispheric patterns, Hermann (1980) suggests that both analytical and conceptual skill are cerebral in nature involving a "thinking"

rather than "feeling" orientation. The left cerebral hemisphere is the domain of the logical, analytical problem solving skills; whereas, the cerebral right hemisphere is adept at conceptualizing and viewing things in a holistic manner. (See Figure 5 for an illustration of this inter-hemispheric dominance).

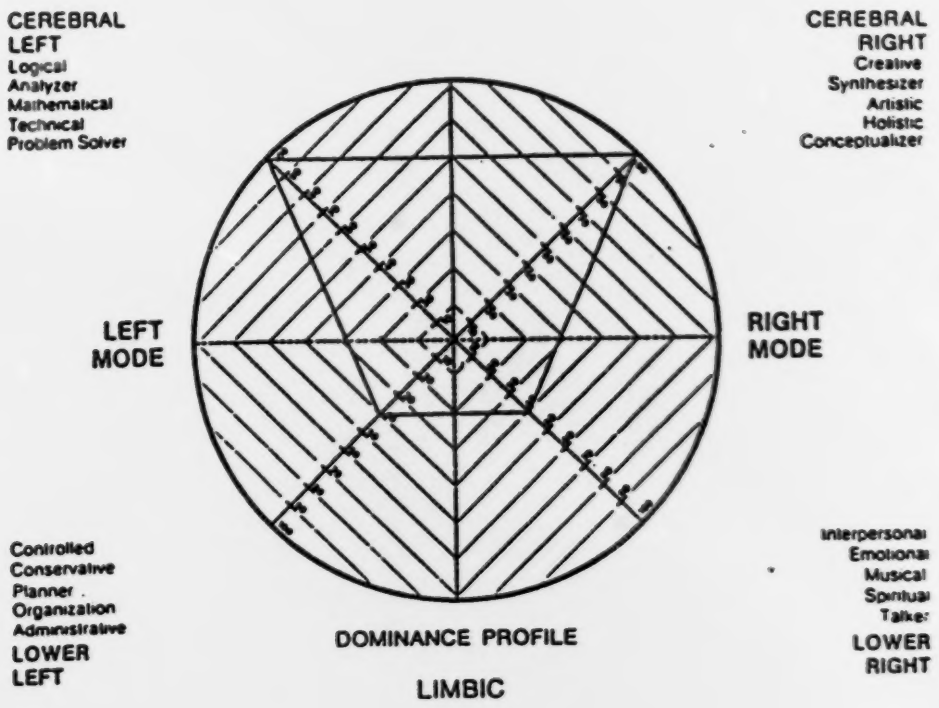

Figure 5: Dominance Style: Analysis vs. Conceptualization

(Look on Figure 6 for complete reference to this also)

In terms of the educational applications of this theory, recent research by Coulson and Strickland (1984:23-27) compares the dominance patterns of Chief Executive Officers (CEO's) in relation to School Superintendents. As demonstrated in Figure 6, the CEO's are more balanced in the use of both cerebral hemispheres than are superintendents; they also demonstrate a far greater use of the right hemisphere.

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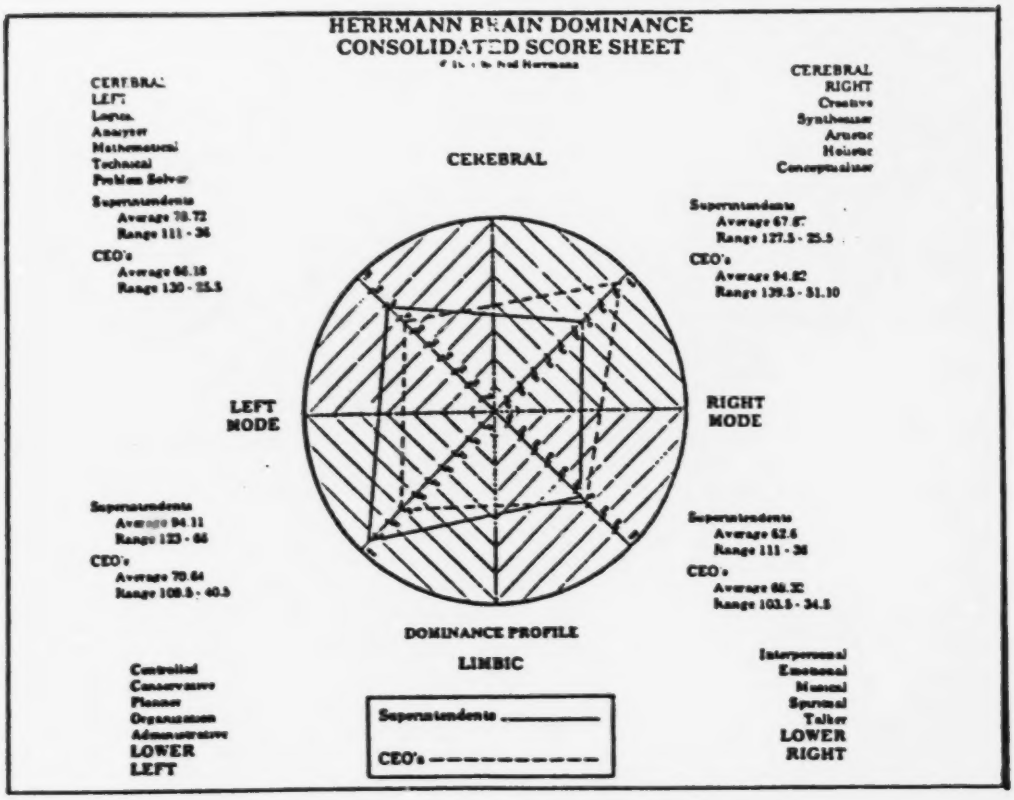

Figure 6: Comparison of Brain Dominance of Chief Executive Officers with School Superintendents.

Source: Louis T. Coulson and Alison G. Strickland. "A Comparison of the Thinking Style Preferences of Superintendents of Schools and Chief Executive Officers," International Brain Dominance Review. Brain Dominance Institute, Lake Lure, N. C., Winter 1984, Vol. 1, Number 1, pp. 23-26.

Intuition vs. Logic

Intuition, as defined by Raudsepp (1981) is an experimental way of knowing or reasoning where the weighting and balancing of evidence are done unconsciously. It is, he says, "a knowing from within" (p.22).

Studies of intuitive awareness among Chief Executive Officers support the importance of intuitive ability to the field of management (Maccoby: Mintzberg: 1976; Pascale and Athos: 1981; Peters and Waterman: 1982). Similar studies of educational administrators have, likewise, confirmed the urgency of this ability being an integral part of a leader's cognitive style (Duignon: 1980; Willis: 1980; and Martin and Willower: 1981).

Herrmann (1980) proposed that the ability to think intuitively is centered in the right-brain and is influenced considerably by the lower limbic area of the right-brain quadrant. Logical thinking, in contrast, is more characteristic of the upper-left cerebral area (See Figure 7).

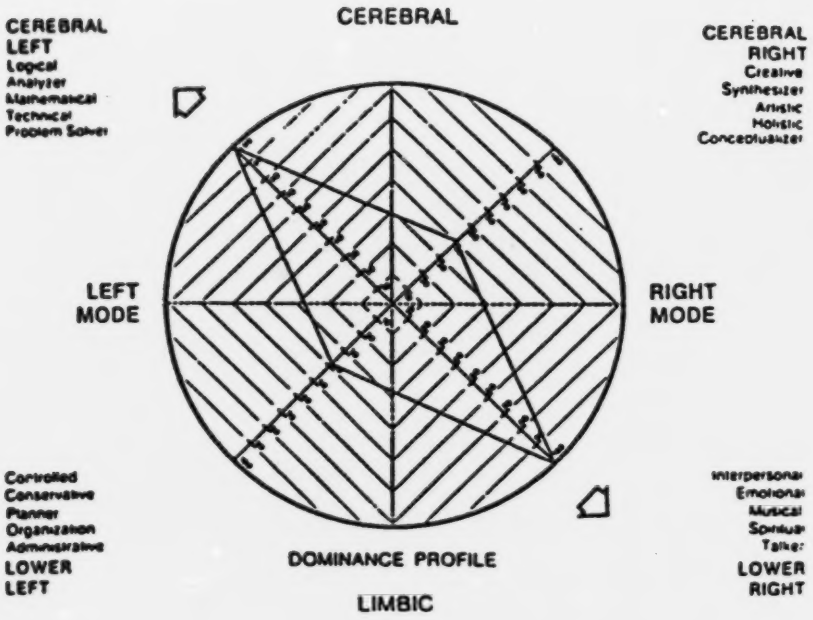

Figure 7: Dominance Style: Logic vs. Intuition.

Source: Ned Herrmann. Materials presented at Application Workshop, Herrmann Brain Dominance Instrument, Lake Lure, North Carolina, February 1983.

Creativity vs. Status Quo

Dyer and Dyer (1965) express their views relative to the differences between creative persons and those more concerned with maintenance; they contend that organizations need both. During the establishment and development phase of an organization there is a real need for creative leaders; however, as an organization progresses to a more routine basis, managerial or custodial types usually replace them. Figure 8 demonstrates this contrast.

CUSTODIAL VS. CREATIVE LEADERSHIP

CUSTODIAL	CREATIVE
Maintains routines. When questioned about them, automatically defends them.	Ignores routines. When made aware of a routine procedure, automatically tries to think of different ways of accomplishing or bypassing the work.
Shows ingenuity only in improving efficiency of present methods, which are characterized by:	Develops completely new missions and products; operations are characterized by:
Simplification Streamlining Mechanization Repetivity Predictability	Basic design changes New breakthroughs Variations Unpredictability
Replaces creative persons by custodial ones	Replaces custodial persons by creative ones.
Seeks perfection of the status quo - drill and inspect, drill and inspect.	Seeks new horizons - speculates and imagines; devises and guesses.
Fears any change; resents new ideas; cannot understand why anyone wants to change what is already working well enough.	Resents frustration; cannot understand reluctance to try new ideas.
Finds that leadership can be summed up in formulas like: "Be firm, fair, and friendly; know your job; know your men; work through people; and be a man."	Equates good leadership with anyone who is willing to listen to ideas, to be permissive and enthusiastic, and to encourage ways of discussing and trying the ideas.

Figure 8: Comparisons between Custodial Attitudes and Creative Attitudes.

Source: Frederick C. Dyer and John M. Dyer. Bureaucracy vs. Creativity. Coral Gables: University of Miami Press, 1965, p. 39.

These writers suggest that:

> A custodial type organization is concerned with achievement of known, predictable measurable items or goals in accordance with familiar, unchanging doctrines, procedures and methods (p.33).

It becomes then the duty of the custodial manager to maintain the status quo, to make only minor changes and to achieve perfection of the routine. Custodial persons avoid change. Dyer and Dyer comment:

> Consciously or unconsciously, the custodial manager recognizes any change as a threat to the predictability of his management and therefore to the efficiency he has achieved (p. 35).

The creative person, in contrast, questions routine. Since it is his desire to vary the "tried and true" he "seeks new approaches, new designs and new breakthroughs" (Dyer and Dyer, 1965:37). It is not the nature of the creative leader to stay with the custodial organization. Those who do remain either become bored and apathetic or are forced out by custodial types. It is only as the organization becomes staffed with more persons of a creative nature, or develops an interest in new approaches or innovation, that the creative individual is content to remain.

What are the implications of this contrast between creative and managerial style for the field of educational administration? Enochs (1981:175-177) suggests that management is "less demanding and less risky" than leadership, but challenges, nevertheless, that leadership is "a process for achieving fundamental changes in hard times." He implores educations' leaders to become active and positive in their approach to their responsibilities. Educational administrators have been charged with the task of turning the educational system around (Culbertson, 1976; Harris, 1976; and Enochs, 1981). This transformation can only take place if administrators cease to operate from a status quo basis.

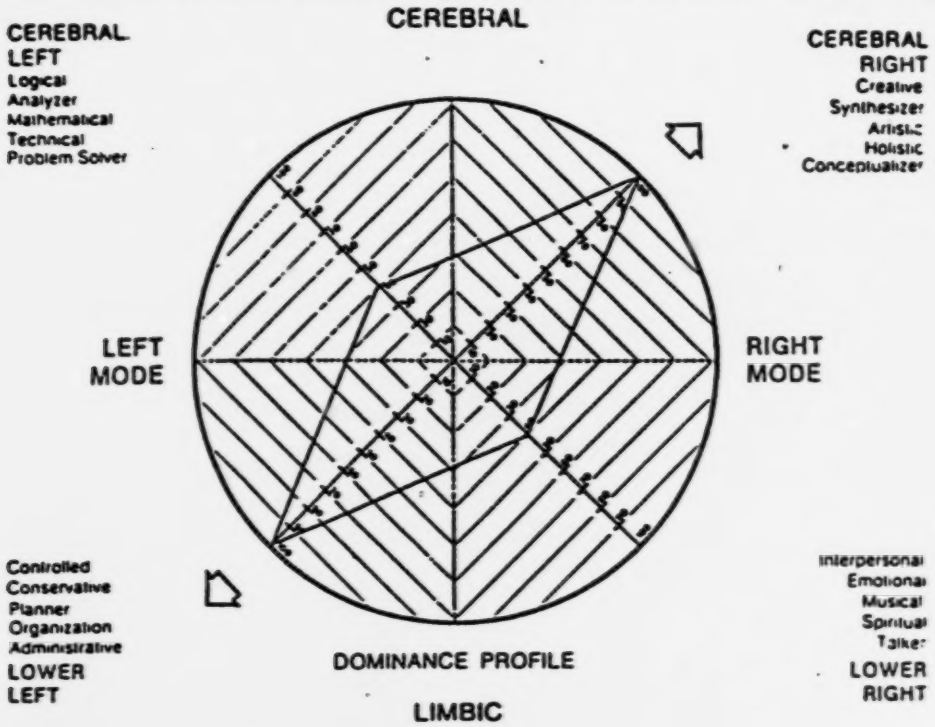

Figure 9: Dominance Style: Creativity vs. Status Quo

Source: Ned Herrmann. Materials presented at Application Workshop, Herrmann Brain Dominance Instrument, Lake Lure, North Carolina, February 1983.

Herrmann suggests that the ability to maintain a proper balance between creativity and status quo is dependent upon the balance of cognitive styles within the person's brain hemispheres (Herrmann, 1980). One's status quo nature comes from the influence of the old reptilian brain which colors the thought processes of the lower left hemisphere. One s creative self, in contrast, is highly dependent upon the full utilization of the upper right cerebral quadrant which operates from a creative desire to alter the status quo. (See Figure 9).

Task vs. Relationship

Maccoby (1981) described the leaders needed for the 80's and beyond as "developers."

> (Such individuals are) oriented not only to developing new products, markets and technology, but also to human development . . .they invite participation in developing new ideas and they encourage subordinates to share power (p. xv).

Developers, Maccoby suggests, demonstrate a leadership style that builds relationships and inspires trust, and they use the organization as the crucible for such development. This concept is confirmed by such research as the 20-year study of successful modern day American corporations conducted by McKinsey and Company (Peters and Waterman: 1981). This study reveals that companies are successful because they value several universal beliefs, not the least of which is the conviction that the greatest resources within their organizations are the human ones.

It seems that human relationship skills are greatly needed by leaders in today's society. Katz (1974:90-102) summed up this need in his discussion of the different managerial skills required by leaders at different levels of the organization; he considered human skills to be a major factor at all levels of management. Katz indicated that human skills were related to the way an individual perceived as well as recognized the perceptions of his superiors, equals and subordinates, and in the way he subsequently behaved. Katz points out that human skill cannot be a some-time thing. Because everything that a leader says and does (or fails to say and do) has an effect on his associates, the leader's true self will in time show through. Human skill must be developed naturally and be an integral part of the leaders' whole being.

Maintaining positive relationships depends to a great extend on one's ability to exercise the right side of the brain particularly that area of the lower right quadrant which is highly controlled by the emotional limbic system as shown in Figure 10 (Herrmann, 1980). This quadrant controls one's abillity to operate from an intuitive feeling basis and allows for a keenness of perception necessary for emphathizing with others. Herrmann defines this quadrant as being both interpersonal and emotional in cognitive style.

Task accomplishment, on the other hand, is influenced more from those abilities indicative of the left hemisphere (Herrmann, 1980). The upper left quadrant influences one's ability to deal with the technical and problem solving aspects of a task; the lower left quadrant influences one's ability to be organized and controlled. Both are qualities necessary for task completion.

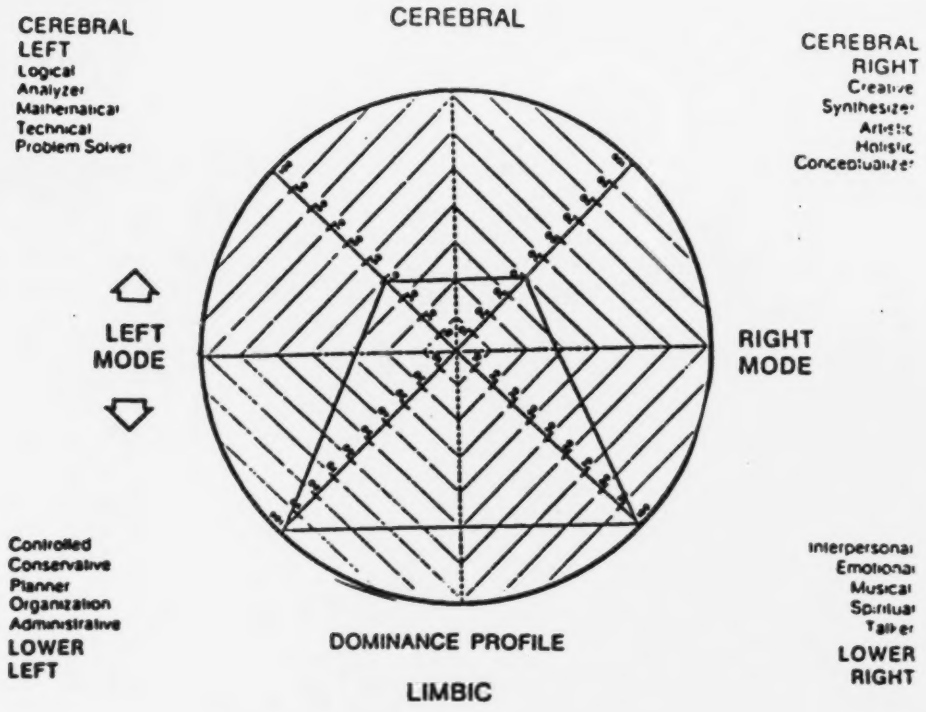

Figure 10: Dominance Style: Task vs. Relationship

Source: Ned Herrmann. Materials presented at Application Workshop, Herrmann Brain Dominance Instrument, Lake Lure, North Carolina, February 1983.

Not only is it important for a leader to be intuned to the people in his organization, but he/she must be sensitive to situations as well. There must be an ability on the part of that leader to be flexible as situations change.

Flexibility vs. Rigidity

Much emphasis has been placed on the idea of situational leadership, which implies that an effective leader will adopt a style of management to match the situation in which the leader must lead. The theory of situational leadership basically centers around the leader being able to alternate appropriately between an approach of relationship orientation in contrast to task.

Tannenbaum and Schmidt (1958) suggest that the successful leader is neither primarily authoritative nor permissive but is instead sensitive to situations and competent in his ability to flex his style to fit the situation. A "style flex" depends upon the leader's consideration of the forces within himself, his subordinates and the situation.

Hersey and Blanchard (1981:31-54) agree that leadership style is not an either/or choice between task and relationship behavior but is, instead, a combination in varying degrees of the two. They propose that a leader has both a basic leadership style and a style range. Style adaptability or style flex is

the degree to which a leader can adapt his style to the demands of a given situation, and even though a leader has a wide-style range, the leader will be ineffective unless she/he possesses the perception needed to make appropriate changes to match a situation.

Herrmann (1980), suggests that one's ability to shift styles effectively is highly dependent upon brain dominance being balanced between left and right hemispheres. This would be especially true of the left and right quadrants situated in the limbic area. Figure 11 illustrates this interrelatedness. Herrmann points out that flexibility is enhanced through the use of the lower right hemisphere which is more attuned to "reading" situations and people and forming judgements as to when style flex is appropriate. Stability, on the other hand, is centered in the lower left quadrant and is represented by the controlled conservatism of this style.

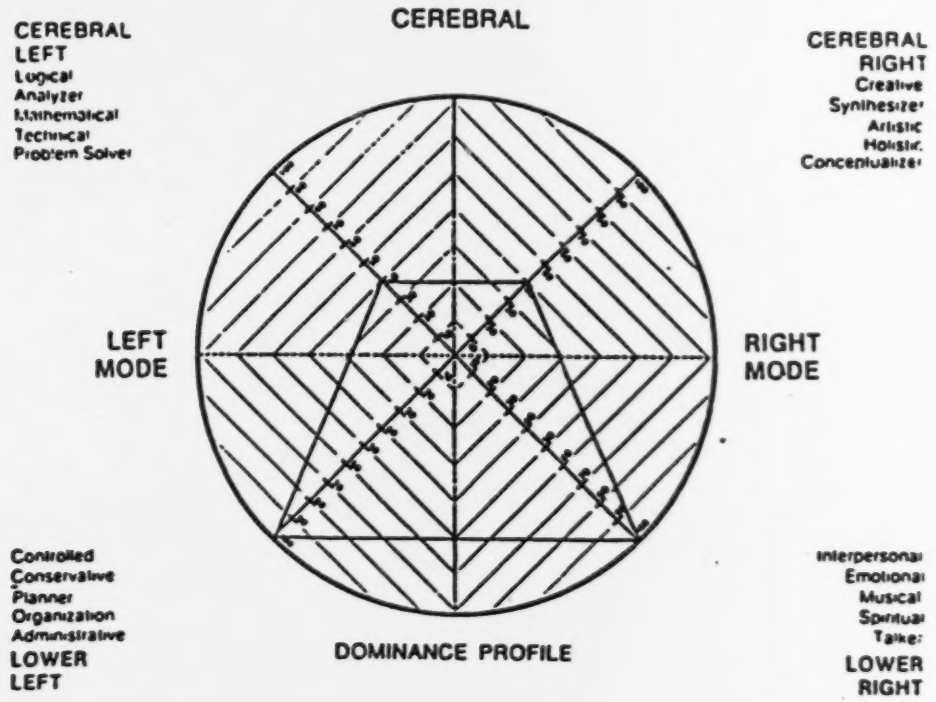

Figure 11: Dominance Style: Flexibility vs. Stability.

These previously discussed leadership qualities can be grouped into more general administrative skills. Katz (1974) has provided such a classification. Katz (1974) classifies administration skills as: technical, human and conceptual. Technical skill is a "specialized knowledge" related to analytical skill within a particular area as well as expertise in the tools and techniques of the subject area being managed. Katz describes technical skill as the most concrete of the administrative skills, and he stresses its importance at the lowest level of management.

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Katz defines human skill as the ability to work with people in building "cooperative effort." Although this skill is important at all management levels, Katz (p. 65) identifies it as being especially crucial at lower levels "where the number of direct contacts between administrators and subordinates is greatest." Conceptual skill is the most important administrative skill at the top level of administration. Katz considers it to be especially crucial as the leader takes on the innovative role of "developing and expanding" the organization.

Utilizing Katz's original classifications of administrative skill, Guglielmino (1980:12-14) attempted to discover the degree of emphasis placed on the respective administrative skills at different levels of management within the organization. He found that 47 percent of the top-level executives' ability was directed toward conceptual skill. This was in contrast to only 18 percent identified at the entry level of management. Figure 12 demonstrates the three administrative skills and their importance at the respective levels.

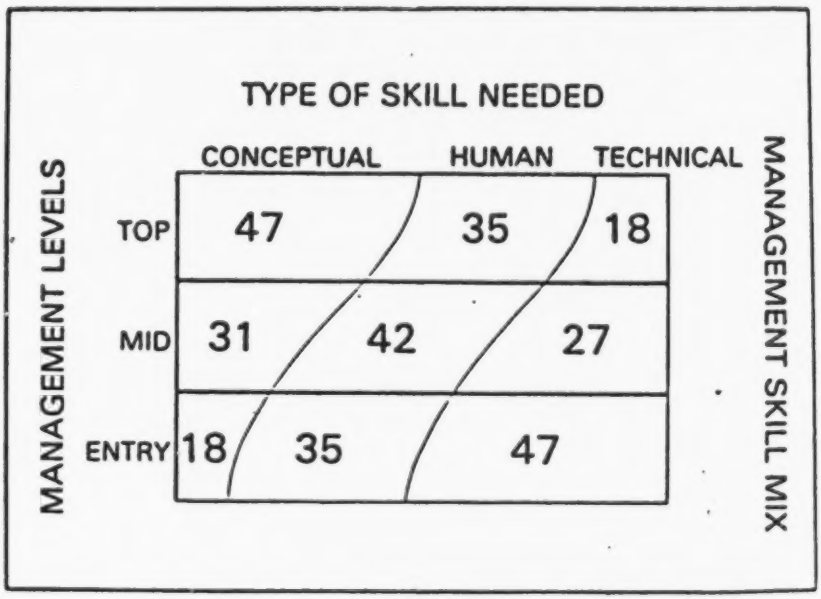

Figure 11: Hierarchy of Management Skills.

Source: Paul J. Guglielmion, "Developing the Top-Level Executive for the 1980's and Beyond, "Training and Development Journal, April, 1979, p. 11.

Summary

If leaders do succeed in blending together all the qualities which have been discussed in this survey of creative leadership, what effect should this have on their ability to bring about educational change? This question will be explored in the final section of this literature review.

> It is time to demand more of ourselves and each other. Businesses, governments and schools must promote a climate of innovation and creativity so that they can raise their standards and goals. This requires results--oriented leadership.

"A Crisis in Mediocrity," Management World, Vol. II, No. 1, January, 1982, p. 21.

Superintendents, principals and supervisors who serve as education's leaders cannot function effectively without realistically accepting the challenge to serve as change agents. This fact emphasizes the need for leaders to be skilled not only in visualizing concepts of the future, but in the implementation of these changes as well. Such leadership requires that leaders exercise a cognitive style that is holistic in its approach. The role of the superintendent in this aspect of the change process is especially crucial.

The Role of the Superintendent

The chief executive is the focal point and determiner of change in an organization. The school superintendent, the chief executive officer of the local school association, executes this role in affecting change in the educational system. The superintendent in fact, defines the purpose for the organization.

According to Weick, (1976) educational systems lack a "consensus on goals and the means to attain those goals" as well as an "unpredictability of problems and of resources to those problems" (p. 673). This makes it difficult for the organization to operate in a typical bureaucratic structure of inter-dependence. Because the ties among educators are weaker than they are in other kinds of organizations (due to less inter-dependence) there is a necessity to strengthen and clarify the purpose that unites individual educators to the organization. Weick suggests that this infusion of purpose is dependent upon the leaders' ability to articulate "a common vision." Paulson (1982:42) expresses this position clearly: "In times of strategic change, the organization must be able to look to him (the leader) as the 'Moses' leading it through the wilderness toward a vision that is clear only to a few."

Although goals are important in specific situations, it is the symbol that helps to clarify exactly what is to be done and why (Weick, 1976). Rody (1978:74) suggests:

> The effectiveness of a leader lies in his ability to make activity meaningful for those in his role set--not to change behavior but to give others a sense of understanding what they are doing, and especially to articulate it so they can communicate about the meaning of their behavior.

The chief executive not only defines the purpose for the organization but he helps to set the "tone" for the way in which that organization will operate. The superintendent is responsible to a large degree for the innovation that will be displayed by others in schools. Osborn (1957) says: "The ideal top executive is both a creative pace-setter and a creative coach. He cultivates the creativity of those around him and makes it bloom. Above all else, he must feel a real regard for the power of ideas" (p. 346).

Owens places much emphasis upon the superintendent in the change process and suggests that his proximity, not only to educational personnel, but to community spokesmen provides him with unique opportunities to fulfill such a mission (Owens, 1970). How effectively the superintendent uses this advantage to affect change is often determined by how she/he is regarded by others (Carlson, 1965).

Have superintendents demonstrated that they are, and will continue to be, innovative leaders who support change? Research does not suggest that this is the case. Schneider (1973) in "Roadblocks to Reform" discusses the research of Zeigler, who studied the change process in education. Zeigler's research does not present a positive picture of the superintendent as an agent for change. The conclusions of Zeigler's study suggest that: "What the superintendent generally wants, unfortunately for the reformers and critics, is status quo" (Schneider, 1973:3).

Implications from this study are that the small percentage of male teachers who remain in the teaching profession for more than five years (and from whom the majority of current administrators are selected) tend to become usually conservative and unwilling to take risks (Schneider, 1973). This research is confirmed by the recent research by Coulson (1984) in which superintendents were compared with Chief Executive Officers and shown to be quite left-brained in style.

IV. Summary of Literature Review

What does this literature review say to the topic of creative leadership and cognitive style? It suggests that if effective changes are to take place within the public schools there must be educational leaders of vision who can creatively conceptualize future educational directions. This implies an ability to "see the forest" instead of merely the trees or to think in a style that is global or holistic. Such is the cognitive style of the right hemisphere.

Not only is it imperitive that education have visionary leadership but that leadership must be courageous in its efforts to move in new directions. The status quo nature, so indicative of left-brained thinking, must be balanced by an open, receptive mode which is again characteristic of an intuitive right-brained nature.

Finally, if educational leaders are to move the educational system forward effectively, they must be adept at working with and through others to accomplish needed change. A humanistic, empathetic feeling for others must exist as well as an intuitive sense of the appropriate. Refinement of these abilities is highly dependent upon a leader exercising his/her right-brained nature or developing the full power of a whole-brained style. If, instead, educational leadership comes predominately from the technical, conservative managerial style of the left hemisphere, there is little likelihood that education will move creatively toward new horizons.

III. Presentation of Findings From Exploratory Research of Hemisphere Dominance and Perceived Innovation

Introduction

A series of questions was used as a guide to this study. For the purpose of this paper only selected questions were chosen for discussion. Readers interested in the complete data may refer to the original dissertation which is on file with AASA.

In presenting this data, questions will serve as introductory points. There will be three sections of this presentation: 1) questions 1 and 2; 2) question 3 and 3) question 5.

Findings

Question 1. What brain dominance patterns are most prevalent among the following groups of educational leaders: nominated superintendents, principals, supervisors and a small random sample of superintendents?

Question 2. What are the differences among these groups in terms of dominance patterns?

These questions seeked to determine not only frequencies but differences in brain dominance patterns between the administrative groups. Data was considered by individual dominance codes, by code clusters and by raw score measurements of left/right dominance (Refer to Appendix A for an explanation of such clusters).

Table 1 presents the frequency distribution by dominance codes for all subjects in the study. As shown, the most prevalant codes were: 1122 (N=29); 1121 (N=16) and 1111, 1112 and 2111 (N=11 respectively). These 5 codes account for a total of 78 (76%) of the 103 subjects in the nominated sample. In contrast, the random sample has 6 subjects (50%) with the 1122 code and 3 (25%) with the 1112 code. In other words, 75% of this groups was represented by 2 only dominance codes.

Table I

FREQUENCY DISTRIBUTION ADMINISTRATORS/SUPERVISORS BY BRAIN DOMINANCE CODE IN TENNESSEE, 1984

	Nominated Sample (N 103)				Random Sample (N=12)			
Dominance Code	Frequency	Cumulative Frequency	Percent	Cumulative Percent	Frequency	Cumulative Frequency	Percent	Cumulative Percent
1111	11	11	10	10	0	0	0	0
1112	11	22	11	21	3	3	25	25
1121	16	38	16	37	0	3	0	25
1122	29	67	28	65	6	9	50	75
1123	1	68	1	66	0	9	0	75
1131	1	69	1	67	0	9	0	75
1132	1	70	1	68	1	10	8	83
1211	1	71	1	69	0	10	0	83
1221	3	74	3	72	1	11	9	92
2111	11	85	11	83	0	11	0	92
2112	7	92	7	89	1	12	8	100
2121	4	96	4	93	0	12	0	100
2122	5	101	5	98	0	12	0	100
2211	2	103	2	100	0	12	0	100

The most frequent codes according to group are presented in Table II. Again the 1122 code is most prevalent for all groups though for principals and supervisors the more holistic codes of 1121 and 2111 are a close second. Although the second most prevalant code for nominated superintendents is also holistic, it is lacking in a primary dominance in the upper right quadrant characterized by conceptual ability.

TABLE II

FREQUENCIES AND PERCENTAGES OF MOST PREVALENT DOMINANCE PATTERNS AMONG ADMINISTRATORS (N=115) IN TENNESSEE, 1984

Group	#1 Code	N	%	#2 Code	N	%	#3 Code	N	%	Total %
Nominated Superintendents	1122	10	37%	1112	5	19%	1111	3	12%	68%
Principals	1122	11	29%	1121	9	23%	1111	5	13%	65%
Supervisors	1122	8	22%	2111	8	22%	2112	6	17%	61%
Random Sample Superintendents	1122	6	50%	1112	3	25%	--	-	-	75%

Dominance codes were clustered according to type resulting in the four major clusters shown in Table III. Based on these groupings, principals and supervisors exceeded superintendents in whole-brained style. Few right-brained individuals were found among school administrators in this study.

TABLE III

FREQUENCY DISTRIBUTION CLUSTER CODE: WHOLE BRAINED, RIGHT BRAINED, LEFT BRAINED, AND LIMBIC BY NOMINATED ADMINISTRATIVE GROUP IN TENNESSEE, 1984

Group	Whole Brained N	Whole Brained %	Right Brained N	Right Brained %	Left Brained N	Left Brained %	Limbic N	Limbic %	Total %
Nominated Group (N=103)									
Superintendents	13		1		12		1		
Percent of Total (103)		13		1		12			
Percent of Group (27)		48		4		44		4	26%
Principals	21		2		11		5		
Percent of Total (103)		20		2		11		5	
Percent of Group (39)		54		5		28		13	38%
Supervisors	20		3		8		6		
Percent of Total (103)		20		3		8		6	
Percent of Group (37)		54		8		22		16	36%
Total	54	52	6	6	31	30	12	12	103
Nominated vs. Random Sample Superintendents (N=39)									
Nominated Superintendents	13		1		12		1		
Percent of Total (39)		33		3		31		3	
Percent of Group (27)		48		4		44		4	69
Random Sample	4		0		7		1		
Percent of Total (39)		10		0		18		3	
Percent of Group (12)		33		0		58		8	31
Total	17	44	1	3	19	49	2	5	100

Not only was dominance considered in relation to code and cluster type, but it was analyzed by using the Herrmann Brain Dominance left and right-brain raw scores of respondents as well. Table IV shows comparisons of the means for all groups when brain dominance is represented by a total of left vs. right-brain score. Supervisors as a group have the highest mean for right-brain dominance of any of the other groups. Random samples and nominated superintendents exceeded the other two groups in left brained score.

TABLE IV

MEANS FOR LEFT/RIGHT BRAIN DOMINANCE BY ADMINISTRATIVE GROUP IN TENNESSEE, 1984

Variable	Number	Mean	Standard Deviation	Minimum	Maximum	Standard Error	Sum	Variance
Nominated								
Superintendents								
Right	27	77.89	19.88	45	121	3.83	2103	395.10
Left	27	128.11	8.95	113	142	1.72	3459	80.18
Principals								
Right	39	88.69	21.18	59	158	3.39	3459	448.38
Left	39	118.67	16.69	82	148	2.67	4628	278.49
Supervisors								
Right	37	97.95	28.29	55	185	4.65	3624	800.05
Left	37	105.46	20.76	47	136	3.41	3902	431.09
Total Group								
Right	103	89.18	24.74	45	185	2.44	9186	611.84
Left	103	116.40	18.92	47	148	1.86	11989	358.02
Random Sample								
Superintendents								
Right	12	75.83	18.16	42	109	5.24	910	329.97
Left	12	131.83	15.04	91	150	4.34	1582	226.33

Comparison of Results of This Study to Coulson's Recent Research: Superintendents

Findings of this study support the research by Coulson (1983) in which his Chief Executive Officers (CEOs) were compared against school superintendents.

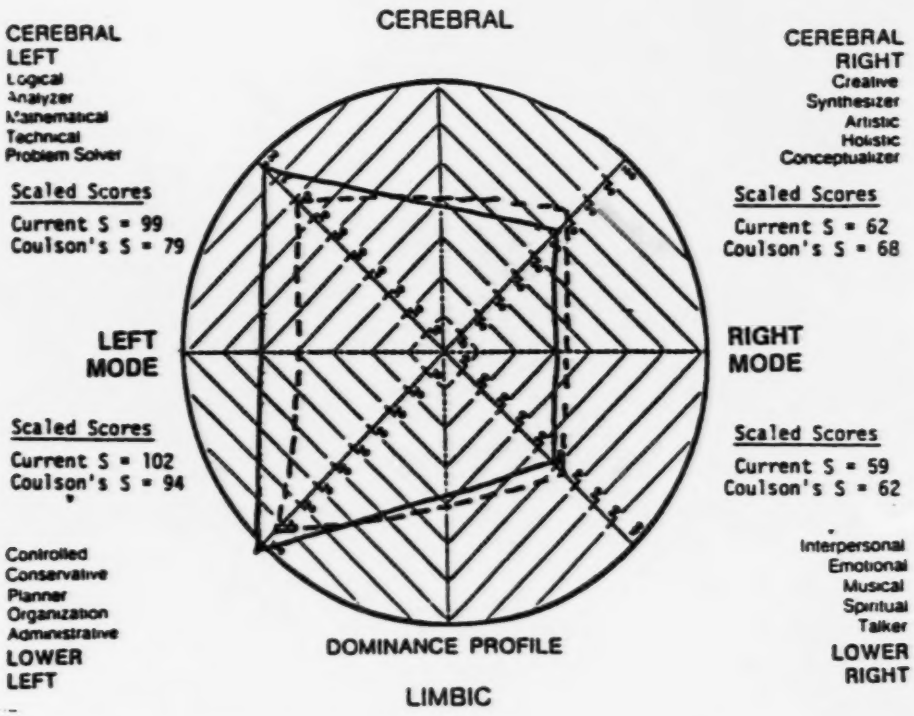

Figure 13: Dominance Profiles of School Superintendents in Current Study and School Superintendents in Coulson Study.

Coulson's S = Superintendents in Coulson's Study
Current S = Nominated Superintendents in Current Study

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Using Coulson's same CEO profiles for comparison, the profiles of superintendents in this study (Figure 13) shows even greater differences in cognitive style when compared with CEOs than did the superintendents in Coulson's study (Figure 14).

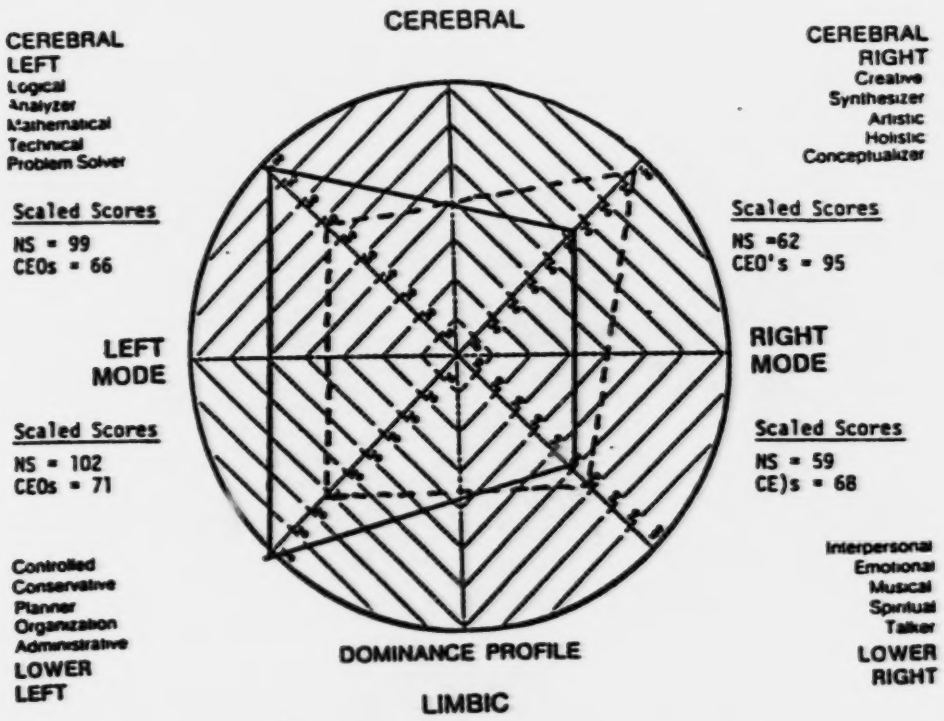

Figure 14: Dominance Profiles of School Superintents and Chief Executive Officers.

NS = Nominated Superintendents in Current Study.
CEOs = Chief Executive Officers—in Coulson's Study.

The most pronounced difference among these groups when comparing their profiles is in the upper left quadrant represented by logical analytical thought processes. CEOs, when compared with the nominated superintendents in ths study, are highly intuitive-conceptual as measured by the scaled scores (SS) in the upper right brain quadrant (95 right SS--66 left SS). In contrast, nominated superintendents are highly logical and analytical (99 left SS--62 right SS) as shown by the upper left quadrant. The superintendents are strong in the controlled, conservative administrative quadrant of the lower left hemisphere (102 left SS--59 right SS) and the CEOs show an almost equal balance between both hemispheres in the limbic area (71 left SS--68 right SS). In neither case for the CEO's does this represent a dominance in the limbic area.

What we see reflected in this study among the superintendents who were selected by a nomination process as being the most effective in the state, is a groups of administrators of an established order rather than visionary leaders of a new age. These are persons who will base decisions on calculated facts and details with very little of the intuitive feeling of what is appropriate to the situation.

Random sample superintendents likewise appear quite dissimilar to Coulson's CEOs in both cerebral quadrants (Figure 15). At the same time they are quite similar to this study's nominated superintendents except for slight differences in three of the four quadrants. As shown in Figure 15 they show a slightly greater dominance in the lower left quadrant than do the nominated group (Random Sample Superintendents Mean SS=107); nominated Superintendent's Mean SS=102). At the same time they exhibit equal dominance in the lower right quadrant (Random Sample Superintendents mean SS=59; Nominated Superintendent's SS=59) and slightly less in the upper right (Random Sample SS=56; Nominated Superintendent SS=62).

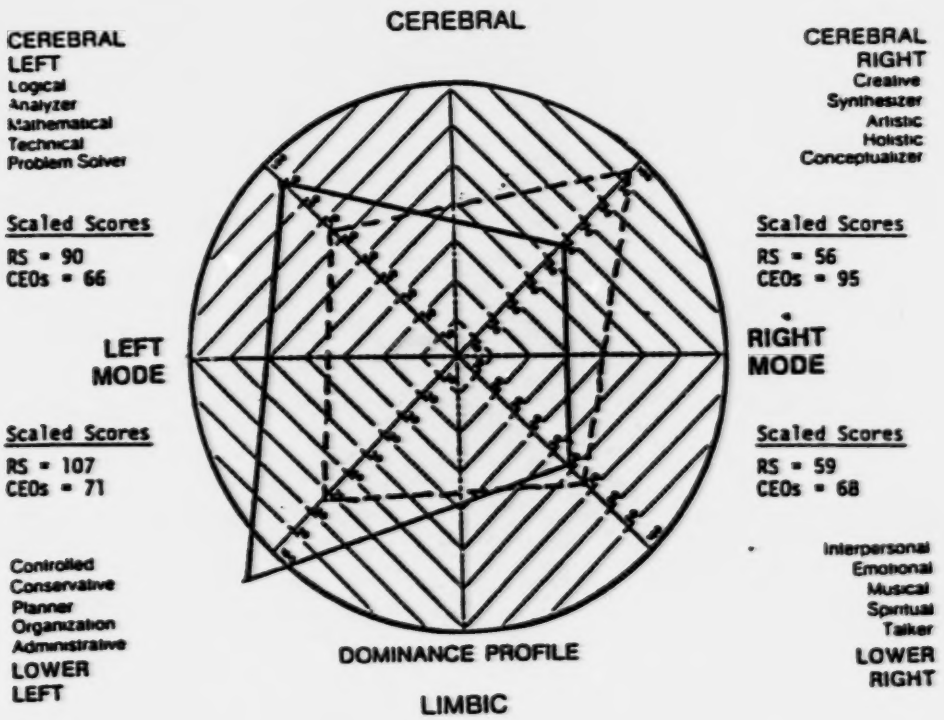

Figure 15: Dominance Profiles of Random Sample School Superintendents and Chief Executive Officers.

CEOs = Chief Executive Officers in Coulson's Study.
RS = Random Sample Superintendents in Current Study.

From these comparisons the random sample of superintendents appears slightly more conservative and status quo in thinking style and a little less strong in the conceptualizing mode than do the nominated sample superintendents. This finding which confirms the comparison of left to right- brain percentages

among the groups (Nominated Sample: 52 percent right brained--48 percent left-brained; random sample: 33 percent right-brained--62 percent left-brained), adds support to the nomination process.

Principals

A comparison of the profiles of principals in this study to Coulson's CEOs shows that while the principals are not as creative-conceptual (as measured by the upper right quadrant) as the CEO's, they do exhibit a healthier balance between the logical, analytical nature of the cerebral left hemisphere and the creative right hemisphere than do either of the superintendent's groups.

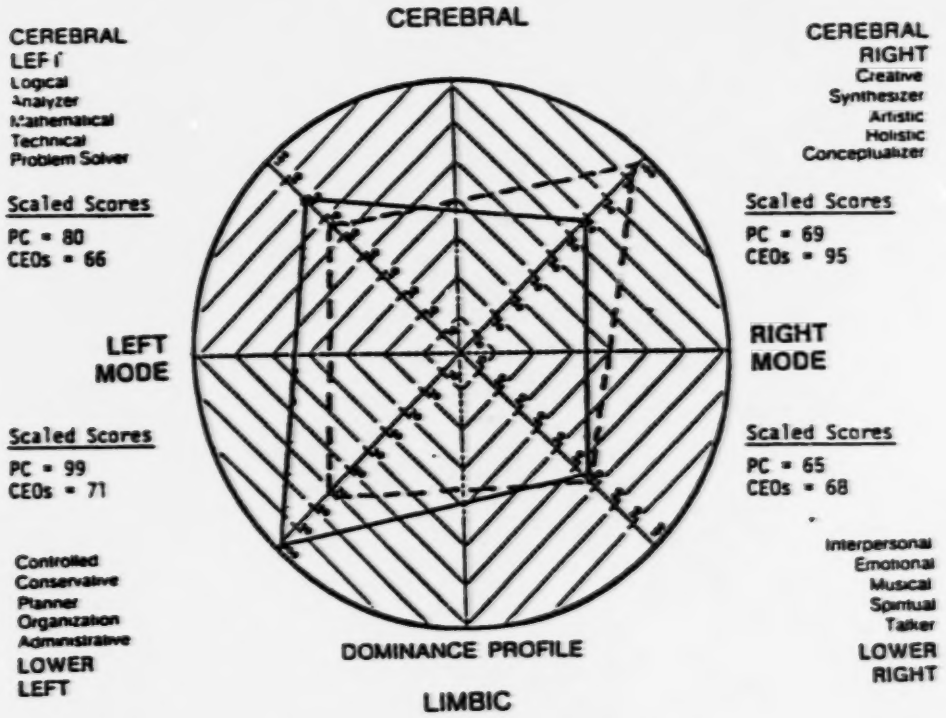

Figure 16: Dominance Profiles of School Principals and Chief Executive Officers.

CEAs = Chief Executive Officers in Coulson's Study
PC = Principals in Current Study.

These findings are important in view of the newest emphasis on the principal as educational leader. Such results suggest that while principals may not be as visionary as would be the ideal, neither do they rely in problem solving solely on logical solutions based on an accumulation of facts.

Supervisors

Very similar patterns and styles exist for supervisors as for principals. There is, however, a much stronger tendency for supervisors to manifest a higher mean score in right-brain dominance and a high percentage of respondents with a whole-brained/right-brained style when viewed by dominance codes (62 percent right to 38 percent left).

Supervisors, whose job it is to conceptualize system needs from a global perspective, appear slightly stronger than any other educational group in their capacity to conceptualize as reflected by their higher right-brained scores. In terms of the lower right hemisphere characterized by interpersonal style, they exceed the other two educational administrator groups as well as the CEOs (see Figure 17).

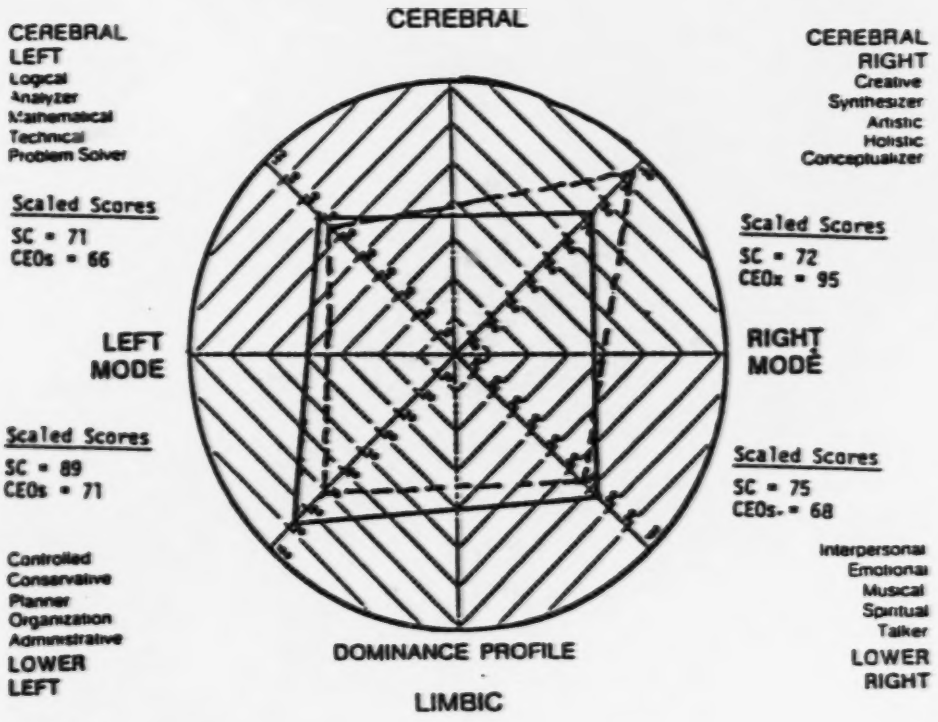

Figure 17: Dominance Profile of Nominated Schools Supervisors and Chief Executive Officers.

CEOs = Chief Executive Officers in Coulson's Study
SC = Supervisors in Current Study.

This finding is supported by the high ranking they received from their nominators in human skills (See Table VI, page 33) 41 percent received a top ranking, 1, in this skill. This is significant in terms of their need to work with others in instructional development and staff improvement.

Total Nominated Sample

Some interesting similarities are revealed among the three nominated groups, (i.e., superintendents, principals and supervisors) as shown in Figure 18. First, as a group these administrators appear quite similar in the degree of conceptual-creative style that they display. The scaled score mean for each nominated group falls between 62 and 72. A similar finding appears in the lower left quadrant representing organizational ability and status quo orientation where the mean scaled scores for all groups fall between 71 to 99 points.

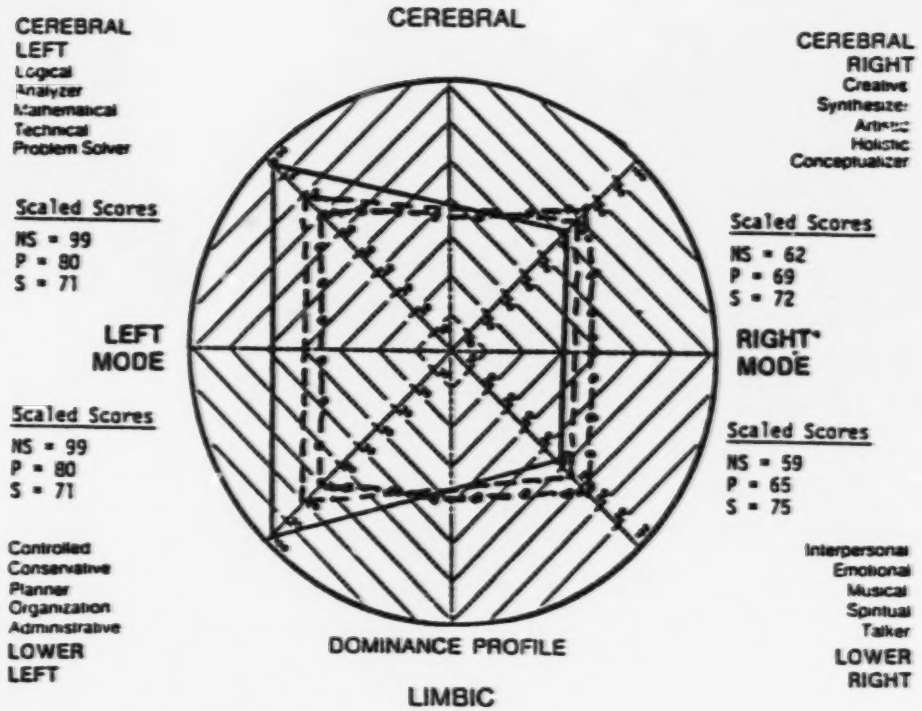

Figure 18: Profiles of Nominated Superintendents, Principals and Supervisors.

NS = Nominated Superintendents
P = Principals
S = Supervisors

Figure 19 represents a composite profile of all administrators in the nominated sample (N=103). This composite places the administrators in this study into the 1121 dominance cluster characterized by not only a strong left brain dominance (which reflects logical analytical skills as well as organizational ability) but also a dominance in the upper-right brain quadrant (which is necessary for conceptualized thinking and intuitive response).

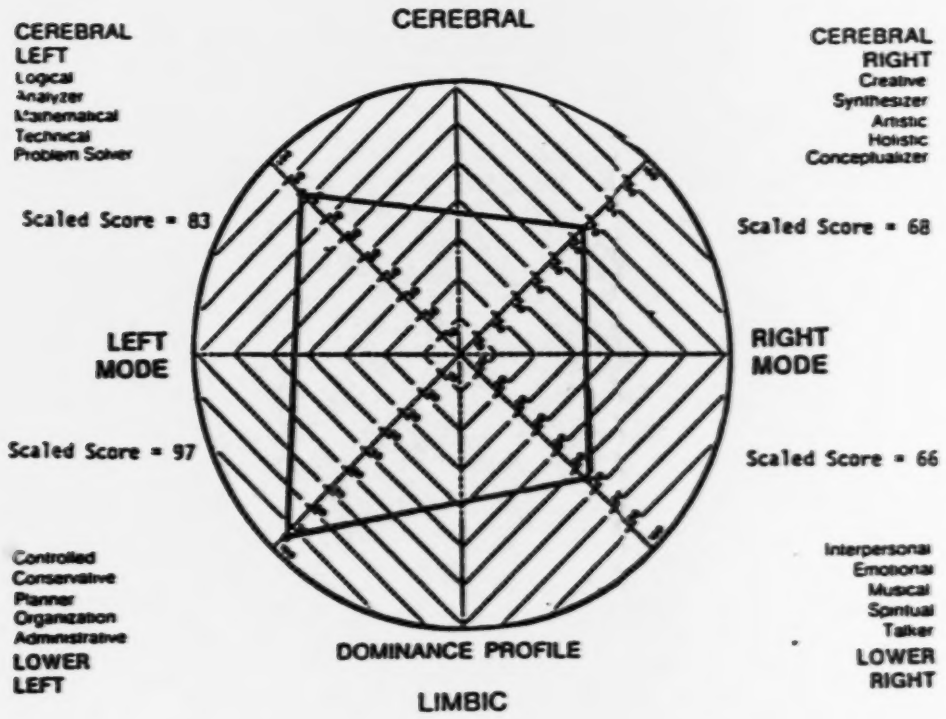

Figure 19: Composite Profile of School Administartors--Code 1121, (N=103)

Question 3. Is their a difference among respective nominated groups between brain dominance as measured by the Herrmann Instrument and the Katz skills of management used in the nomination: conceptual, technical and human?

Administrators in this study were ranked by the nominators according to the three leadership skills identified by Katz (1974): conceptual, human and technical (See Appendix C).

Table VI presents the frequency distributions and percentages of subjects receiving such rankings for each administrative group. As shown, superintendents ranked highest in technical skill (45 percent) and lowest in conceptual skill (15 percent); principals ranked highest in conceptual skill (36 percent) and lowest in technical skill (31 percent); and supervisors ranked highest in human skills (41 percent) and lowest in conceptual and technical skills respectively (30 percent).

TABLE VI

FREQUENCY DISTRIBUTION CONCEPTUAL, HUMAN, TECHNICAL NOMINATIONS BY ADMINISTRATIVE GROUP AND NOMINATION RANK IN TENNESSEE, 1984

Rank		Superintendents				Principals				Supervisors		
		Conceptual	Human	Technical	Total	Conceptual	Human	Technical	Total	Conceptual	Human	Technic
1	Number	4	11	12	27	14	13	12	39	11	11	11
	Percent of Group	(15%)	(41%)	(45%)	101	(36%)	(34%)	(31%)	101	(30%)	(41%)	(30%)
2	Number	9	12	6	27	10	18	11	39	8	15	14
	Percent of Group	(34%)	(45%)	(23%)	102	(26%)	(47%)	(29%)	102	(22%)	(41%)	(38%)
3	Number	14	4	9	27	15	8	16	39	18	7	12
	Percent of Group	(52%)	(15%)	(34%)	101	(38%)	(21%)	(41%)	100	(49%)	(19%)	(33%)
Total Number		27	27	27		39	39	39		37	37	37
Total Percent		101	101	102		100	102	101		101	101	101

NOTE: Percent may not = 100 due to rounding.

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The total group was viewed in terms of whole-brain/right vs. left-brain/limbic dominance in relation to administrative skill and nomination rank. Table VII contains Chi Square analysis for each of the administrative skills based on dominance classification and nomination rank. Results of the Chi Square analysis ($p = < .05$) indicate that those most likely to receive a high ranking on conceptual skill were whole-brained/right-brained in cognitive style (23 percent right vs. 5 percent left). Those receiving a lower ranking on conceptual skill were more evenly divided between right and left-brain style (24 to 21 percent).

TABLE VII

PERCENTAGE OF RIGHT AND LEFT HEMISPHERE SUBJECTS BY RANK OF NOMINATION AND CLASSIFICATION CONCEPTUAL, HUMAN AND TECHNICAL SKILL (N=103) IN TENNESSEE, 1984

Nomination Rank	Conceptual			Human			Technical		
	Right	Left	Total	Right	Left	Total	Right	Left	Total
1	24 (23%)	5 (5%)	37 (28%)	21 (20%)	18 (17%)	39 (38%)	15 (15%)	20 (19%)	35 (34%)
2	11 (11%)	16 (16%)	27 (26%)	29 (28%)	16 (15%)	45 (44%)	20 (19%)	11 (11%)	31 (30%)
3	25 (24%)	22 (21%)	47 (46%)	10 (10%)	9 (9%)	19 (18%)	25 (24%)	12 (12%)	37 (36%)
Total	60 (58%)	43 (42%)	103 (100%)	60 (58%)	43 (42%)	103 (100%)	60 (58%)	43 (42%)	103 (100%)
	Chi Square 11.06 df=2 Probability .004			Chi Square 1.26 df=2 Probability .53 ns			Chi Square 5.23 df=2 Probability .07		

Rating of human skill has less relationship to a specific cognitive style ($p > .53$) while ratings of technical skill approached significance (.07) for a left-brained cognitive style.

This finding is further confirmed through a series of t-test in which the right-brain score of conceptual ranking number 1 was compared with the right-brain score of technical ranking number 1. Table VIII presents these data which support the conclusion that conceptual skill, as determined by highest nomination rank, is more closely related to right-brain dominance than is technical skill. This is true for the total group ($p = .0004$) and for the nominated superintendents ($p = .01$). It is true (but not significant) to a lesser degree for principals ($p = .07$) and supervisors ($p = .13$).

TABLE VIII

t-TEST--CONCEPTUAL #1 AND TECHNICAL #1 BY RIGHT BRAIN SCORE FOR ADMINISTRATIVE GROUPS IN TENNESSEE, 1984

	Number	Mean	Standard Deviation	Standard Deviation Error	Minimum	Maximum	t-test	Degrees of Freedom	Probability
Total Group									
Conceptual #1	29	102.68	28.31	5.25	66	185	3.77	50	.0004*
Technical #1	35	78.82	20.77	3.51	45	150			
Superintendents									
Conceptual #1	4	105.50	18.30	9.15	79	121	3.80	4	.01*
Technical #1	12	67.08	14.84	4.28	45	88			
Principals									
Conceptual #1	14	97.07	25.81	6.89	69	158	1.86	21	.07 ns
Technical #1	12	82.00	14.49	4.18	65	115			
Supervisors									
Conceptual #1	11	108.81	34.49	10.39	66	185	1.56	18	.13 ns
Technical #1	11	88.18	26.82	8.08	55	150			

*Significant ($p \leq .05$).

A similar finding was revealed when a t -test was used to compare the right brain scores of those individuals receiving a nomination rank of 1 in conceptual skill against those receiving nomination ranks of 2 or 3. As shown in Table IX, results clearly support the likelihood that superintendents nominated as highly conceptual (i.e., "1") will also be right-brained (p = .03). Results for the other two groups are not significant, but they tend toward the same conclusion (principals at p = .10 and supervisors at p = .19).

TABLE IX

t-TEST--CONCEPTUAL #1 AND CONCEPTUAL #2 OR #3 BY RIGHT BRAIN SCORE FOR ADMINISTRATIVE GROUPS IN TENNESSEE, 1984

	Number	Mean	Standard Deviation	Standard Deviation Error	Minimum	Maximum	t test	Degrees of Freedom	Probability
Superintendents									
Conceptual #1	4	105.50	18.30	9.15	79	121	3.32	3.8	.03*
Conceptual #2	23	73.08	16.07	3.35	45	109			
Principals									
Conceptual #1	14	97.07	25.81	6.89	69	158	1.70	19.4	.10 ns
Conceptual #2	25	84.00	16.88	3.37	59	124			
Supervisors									
Conceptual #1	11	108.81	34.49	10.39	66	185	1.35	14.5	.19 ns
Conceptual #2	26	93.34	24.54	4.81	55	150			

*Significant ($p \leq .05$).

The final stage of analysis employed in this question was to isolate each position value in the individual brain dominance code and to measure the value of that position in terms of the qualities it represented against the Katz skill that most nearly represented what that quadrant of the brain was purported to measure. In a dominance code such 2132, the position codes are:

I	II	III	IV
2	1	3	2

Position 1 relates to technical skill as it applies to logical, analytical reasoning; Position II more closely relates to technical skill defined as organizational ability; Position III relates to human relations skill, and Position IV relates to creative or conceptual skill. A Chi Square analysis was used to investigate the relationships among the variables of Katz skill rank against brain dominance position value or code as shown by the sample Chi Square (Table X).

TABLE X

RESULTS OF CHI SQUARE ANALYSES OF KATZ'S ADMINISTRATIVE SKILL RANKING BY DOMINANCE POSITION VALUE FOR TOTAL GROUP (N=103) IN TENNESSEE, 1984

	Technical Skill/ Position I			Technical Skill/ Position II			Human Skill/ Position III			Conceptual Skill/ Position IV		
	Dominance Code Value			Dominance Code Value			Dominance Code Value			Dominance Code Value		
Rank	1	2+3	Total	1	2+3	Total	1	2+3	Total	1	2+3	Total
1	29 (29%)	6 (6%)	35 (34%)	34 (33%)	1 (1%)	35 (34%)	21 (20%)	18 (17%)	39 (38%)	23 (22%)	6 (6%)	29 (28%)
2	21 (20%)	10 (10%)	31 (30%)	29 (28%)	2 (2%)	31 (30%)	15 (15%)	30 (29%)	45 (44%)	9 (9%)	18 (17%)	27 (26%)
3	24 (23%)	13 (13%)	37 (36%)	34 (33%)	3 (3%)	37 (36%)	7 (7%)	12 (12%)	19 (18%)	17 (17%)	30 (29%)	47 (46%)
Total	74 (72%)	29 (28%)	103 (100%)	97 (94%)	6 (6%)	103 (100%)	43 (42%)	60 (58%)	103 (100%)	49 (48%)	54 (52%)	103 (100%)
	Chi Square 3.24 df=2 Probability .19			Cells to Sparse to Compute			Chi Square 3.85 df=2 Probability .15			Chi Square 16.35 df=2 Probability .0003		

Table X shows that position value is highly significant (p = .0003) for all subjects when the dominance code of Position IV is analyzed relative to the ranking that subjects received on conceptual skill. Although non-significant, data tended in the expected direction for the analysis of Positon III and human skills (p = .15) and Position I and technical skill (p = .19). A Chi Square analysis was not possible for Position II due to small cell size in key cells, however a review of the percentages indicate a definite trend for those nominated #1 Technical Skill to be dominant in Position II (i.e., 33% - 1%).

Technical skill, defined as a logical, theoretical knowledge base that can be applied as educational technique, is reflected by a dominace in the upper left quadrant of the brain dominance pattern (Position I). The comparison among groups shows that significant differences (p = .006) do exist relative to the degree of dominance present in that quadrant. For superintendents and principals there is a definite tendency for those ranked #1 in technical skill to be dominant in the upper left quadrant; for supervisors the tendency is less apparent (Table XI).

TABLE XI

ADMINISTRATIVE GROUP BY NOMINATION VALUE OF ADMINISTRATIVE SKILL AS DEFINED BY KATZ (N=103) IN TENNESSEE, 1984

Group		Technical Skill/ Position I Dominance Code Value 1		2 or 3		Total		Technical Skill Position II Dominance Code Value 1		2 or 3		Total		Human Skill/ Position III Dominance Code Value 1		2 or 3		Total		Conceptual Skill/ Position IV Dominance Code Value 1		2 or 3		Tot.
		#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#
Superintendents (N=27)		24		3		27		26		1		27		9		18		27		10		17		27
Percent of Total			23		3		26		25		1		27		9		17		26		10		17	
Percent of Group			89		11				96		4				33		67				37		63	
Principals (N=39)		30		9		39		38		1		39		13		26		39		19		20		39
Percent of Total			29		9		38		37		1		38		13		25		38		18		19	
Percent of Group			77		23				97		3				33		67				49		51	
Supervisors (N=37)		20		17		37		33		4		37		21		16		37		20		17		37
Percent of Total			19		17		36		32		4		36		20		16		36		19		17	
Percent of Group			54		46				89		11				57		43				54		46	
Total	N	74		29		103		97		6		103		43		60		103		49		54		103
	%		72		28		100		94		6		100		42		58		100		48		52	1
		Chi Square 10.16 df=2 Probability .006						Cells to Sparse to Compute						Chi Square 5.34 df=2 Probability .07						Chi Square 1.84 df=2 Probability .40				

The strong tendencies in this direction within groups appear to be with superintendents who show a percentage differential of 89 to 11 for high dominance score in relation to high technical nomination and principals who exhibit a dominance pattern in the same direction (77 to 23 percent). For supervisors this factor seems to have little influence (54 to 46 percent). The total groups, however, demonstrates a likelihood of 72 to 28 percent that those nominated #1 in technical skill will have a dominance in the upper left quadrant. This represents a ratio for the total group of 2.5 to 1.

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In considering Positon II which relates to one's ability to organize, manage and maintain the status quo, Chi Square analysis was not possible due to the sparseness of certain cells. When various groups are reviewed on the basis of percentages, however, the results support the expected result: superintendents 96 to 4 percent; principals 97 to 3 percent; supervisors 89 to 11 percent; and for the total group 94 to 6 percent.

Human relations skill, as measured by Position III, approaches significance for a left-brained dominance (codes 2 and 3). For superintendents and principals this difference is for a left-brain rather than a right-brain dominance is strong (superintendents 33 to 67 percent, principals 33 to 67 percent). Supervisors are 57 to 43 percent in favor of right-brain dominance for this skill, but the total group reflects a tendency for a left-brain dominance (42 to 58 percent).

The final quadrant, related to conceptual skill, appears more balanced among groups and produces no significant differences. The superintendent's group alone has some differential among percentages with the larger percent favoring left-brain dominance (37 to 63 percent). Other percentages include: principals 49 to 51 percent; supervisors 54 to 46 percent and total group 48 to 52 percent.

Discussion of Nomination Rankings:

An analysis of the dominance patterns of educational administrators in terms of their nominated characteristics substantiates the validity of the rankings assigned. As demonstrated, those most likely to receive a high ranking in conceptual skill were right-brained. (Superintendents were predominately left-brained and nominated relatively low in conceptual skill). Those most likely to receive a high ranking in technical skill were predominately left-brained. Principals, who were more characteristically whole brained than other groups ranked highest in conceptual skill.

A brief glance backward at the work of Katz (1974) suggests that conceptual skill should be the most pronounced quality of leadership at the highest administrative level. Next in importance is human skill and finally technical skill. Guglielmino (1979) found this same situation to be true in his study of administrative skills in Fortune 500 Companies. The data from this present study of educational administrators indicate that only in the realm of human skills are the nominated skills most characteristic of those suggested for the particular level of leadership found.

A close examination of educational leadership level suggests that the school principal's role differs from the typical mid-management role found in most organizations. This is true particularly in view of the new emphasis being placed on the principal as an instructional leader and guide for educational purpose and school climate. Based upon this emerging leadership role, the higher scores in conceptual skill given principals in the study seem appropriate. Similarly the higher emphasis on human relations skills among supervisors is needed if they are to serve as developers of human resources. But where will our educational vision originate if those who lead us (i.e., superintendents) are so sadly lacking in their ability to conceptualize?

TABLE XII

t-TEST TOTAL SCORE ON PERCEIVED INNOVATION QUESTIONNAIRE BY BRAIN DOMINANCE (RIGHT/LEFT) FOR ADMINISTRATIVE GROUPS IN TENNESSEE, 1984

Score on PIQ	Number	Mean	Standard Deviation	Standard Error	Minimum	Maximum	t	Probability
Total Group (N=103)								
Right	60	175.88	35.12	4.53	118	270	1.85	.06
Left	43	163.04	34.12	5.20	65	231		
Nominated Superintendents (N=27)								
Right	14	178.14	38.37	10.25	135	269	1.22	.23
Left	13	160.61	35.82	9.93	65	226		
Principals (N=39)								
Right	23	178.86	35.21	7.34	118	270	.68	.49
Left	16	170.81	36.50	9.12	116	231		
Supervisors (N=37)								
Right	23	171.52	34.14	7.11	122	259	1.40	.17
Left	14	156.42	30.20	8.07	108	218		
Subtotal Group (N=103)								
Right	60	97.11	22.79	2.94	59	160	2.83	.005*
Left	43	84.91	20.90	3.18	44	140	2.79	
Nominated Superintendents (N=27)								
Right	14	92.78	25.48	6.81	66	160	1.41	.17
Left	13	80.53	19.35	5.36	55	123	1.39	
Principals (N=39)								
Right	23	96.65	19.96	4.16	74	159	1.12	.26
Left	16	88.50	23.59	5.89	44	140	1.16	
Supervisors (N=37)								
Right	23	100.21	24.27	5.06	59	160	2.14	.03*
Left	14	84.57	19.70	5.26	48	132	2.03	

*Significant ($p \leq .05$).

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As previously discussed, in investigating differences between administrative groups, total score was considered by levels (high, medium, and low) and brain dominance was classified by dominance clusters (whole-brained/right-brained vs. left-brained/limbic). Figure 21 presents percentages based on these factors for all groups. As shown by Figure 21, the principals' group had the highest percentage of right-brained subjects scoring at the highest level of innovation (26 percent) in contrast to nominated superintendents (19 percent) and supervisors (14 percent). Data suggest that, for principals, innovative management depends more upon a right-brained orientation than for either of the other two groups. When considering the total range of scores on the questionnaire, supervisores tend to be whole-brained/right-brained dominant almost 2 to 1 (62 to 38 percent) in contrast to a 1 to 1 ratio for nominated superintendents (52 to 48 percent) and 1.5 to 1 for principals (59 to 41 percent).

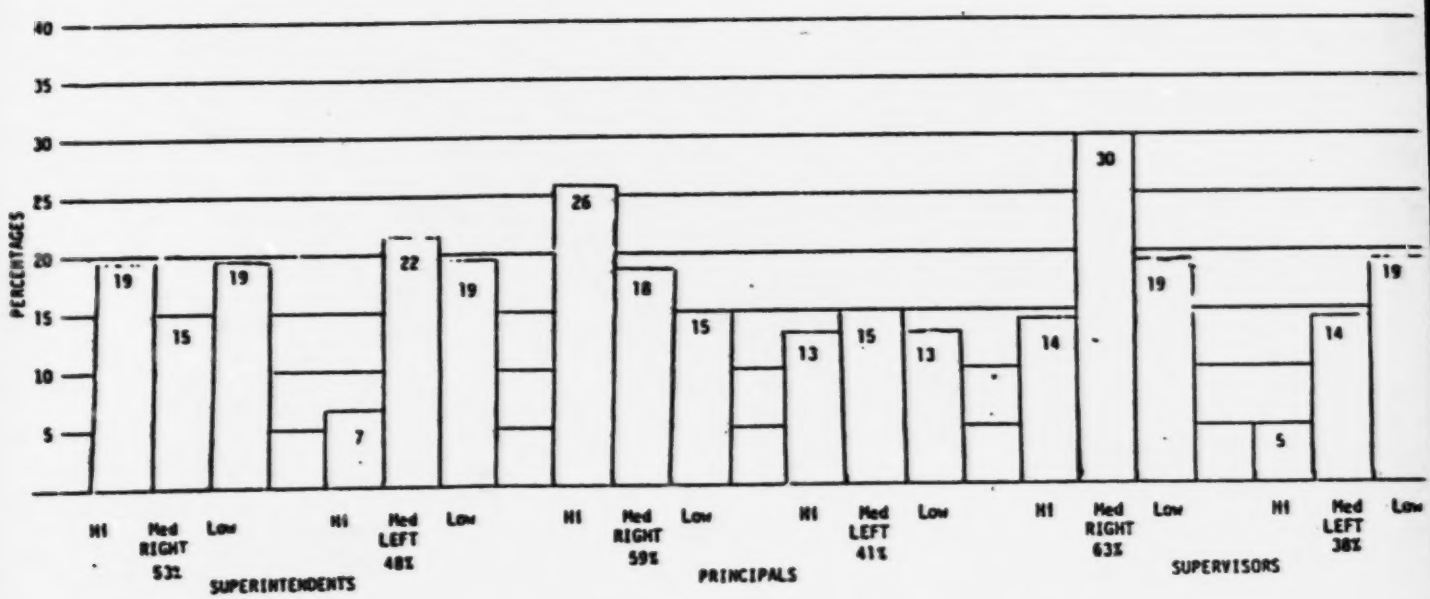

Figure 21: Innovative Management Questionnaire Score Ranges (Low, Medium, High) for a Nominated Administrative Group by Right or Left Dominance.

NOTE: Due to rounding, groups may not equal 100%

Table XIV presents the mean scores of the three nominated administrative groups and the random sample group of the PIQ (Perceived Innovation Questionnaire). As demonstrated, the mean score for each nominated administrative group respectively was within the medium range (i.e., 155 to 182) of the PIQ. The random sample group's was in the high range (198.75). The principals obtained the highest mean scores (176.56) on the PIQ of the nominated groups. The middle score (169.70) was made by superintendents who also had the lowest minimum score (65). The lowest group mean score (165.81) was obtained by the nominated supervisors who also had the lowest maximum score (259) of any group. Greatest variance within groups as shown by standard deviation was with the random sample and nominated superintendents.

TABLE XIV

MEANS, STANDARD DEVIATION, AND RANGE OF SCORES FOR TOTAL SCORE ON PERCEIVED INNOVATION QUESTIONNAIRE BY ADMINISTRATIVE GROUP IN TENNESSEE, 1984

Administrative Group	Number	Mean	Standard Deviation	Minimum	Maximum
Nominated Superintendents	27	169.70	37.52	65	269
Principals	39	175.56	35.50	116	270
Supervisors	37	165.81	33.12	108	259
Random Sample Superintendents	12	198.75	45.04	127	280
Nominated Group	103	170.52	35.12	65	270

Discussion of Line vs. Staff Position

The differences in inovative/brain dominace seem to parallel distinctions between line and staff positions. There appears to be a job related difference in style needed to be innovative. Among superintendents there is a wide difference between the mean scores of their left-brain dominance and the mean scores of their right dominance; the left-brain dominance is higher by a total of 50 points. This fact suggests that for superintendents very little innovation in the form on conceptualization is taking place as reflected by their right-brain score and lower scores on the PIQ. Of the 26 percent of the superintendents' scoring in the high range on the PIQ, 19 percent were right-brained dominant in contrast to only 7 percent who were left-brained. Superintendents in this study do not appear to function appropriately as generators of system ideas; neither do they conceptualize new avenues for change.

Principals manifest 30 points difference in their left and right-brain mean scores. Although this swing is to the left it is important to note that in the high range of innovation as measured by the PIQ principals as a group had the highest percentage of innovators (41 percent) as well as the highest percentage of right-brained subjects at this level of innovation (26 percent). The principal must have a balance in dominance characteristics in order to bring about not only the creation of the idea (i.e., process) but also its fullest implementation (product).

More principals scored in the high range on the PIQ than did supervisors. A possible explanation for this is that from their positions they are quantifiablly able to affect more changes than are supervisors. Because of the nature of their line positions principals can exert more administrative control in seeing that implementation of their ideas takes place.

Supervisors failes to score high on the PIQ even though as a group they manifested the highest right-brain score and best balance between the two hemispheres (only 5 points difference between their mean left and right-brain scores). Indicators suggest that their style is suitable for a change orientation related both to process as well as product. Due to the nature of their staff positions, however, this may not always be reflected in a quantifiable measurement of changes that occur. Because of the central office characteristics of their positions, much of what is conceptualized by the supervisor must ultimately be implemented at the building level and depends upon the building level principal's receptivity to that idea and support in its implementation.

Problems of Instrumentation

There are several explanations as to why the perceived innovation measurement might not fully measure the real innovation of all groups. These are:

1. The Perceived Innovation Questionnaire is based heavily on quantity of change rather than quality of change. Often as one "spreads himself thin" the real significance of change does not take place. A few well developed and implemented changes are often more effective than a large number which are merely set in motion.

2. The design of the scoring procedure forced all groups into one pattern which may not have clearly differentiated the innovation among respective levels. In retrospect, the questionnaire seems more appropriate for those in line positions (particularly principals and superintendents) who are in positions to control change situations. Likewise, this procedure might penalize supervisors who, although they may perceive needs and conceptualize solutions, lack the line authority to insure that effective implementation takes place. They must often depend upon the vision and follow through of those in principal's positions to assist with the actual implementation of their ideas.

3. Data should possibly be reanalyzed using the Subtotal rather than Total Score of the PIQ since it appears to more significantly correlate with brain dominance style.

Sex. There were 70 male and 33 female subjects in this study. The distribution by sex was: nominated superintendents, 27 males, 0 females; principals, 28 males, 11 females; supervisors, 14 males, 22 females; and random sample superintendents, 11 males 1 female.

Table XIII presents frequency distributions and percentages for brain dominance and level of perceived innovation for both sexes. Brain dominance was measured by dominance code and innovation by both a total score on the PIQ and

TABLE XIII

FREQUENCY DISTRIBUTION AND PERCENTAGES BY SEX FOR BRAIN DOMINANCE AND LEVEL OF INNOVATION AS DETERMINED BY PERCEIVED INNOVATION QUESTIONNAIRE (N=103) IN TENNESSEE, 1984

	Male (N=70)						Female (N=33)					
	Right Brain		Left Brain				Right Brain		Left Brain			
Innovation Level	N	%	N	%	Total	%	N	%	N	%	Total	%
Low	12		14		26		6		3		9	
Percent of Total		17		20		26		18		9		27
Percent of Group		46		54				67		33		
Medium	9		16		25		13		1		14	
Percent of Total		13		23		36		39		3		42
Percent of Group		36			64				93		7	
High	13		6		19		7		3		10	
Percent of Total		19		9		27		21		9		30
Percent of Group		68		32				70		30		
Total	34		36		70		26		7		33	
		49		51		100		79		21		100
		Chi Square 4.63 df=2 Probability .09						Chi Square 2.91 df=2 Probability .19				

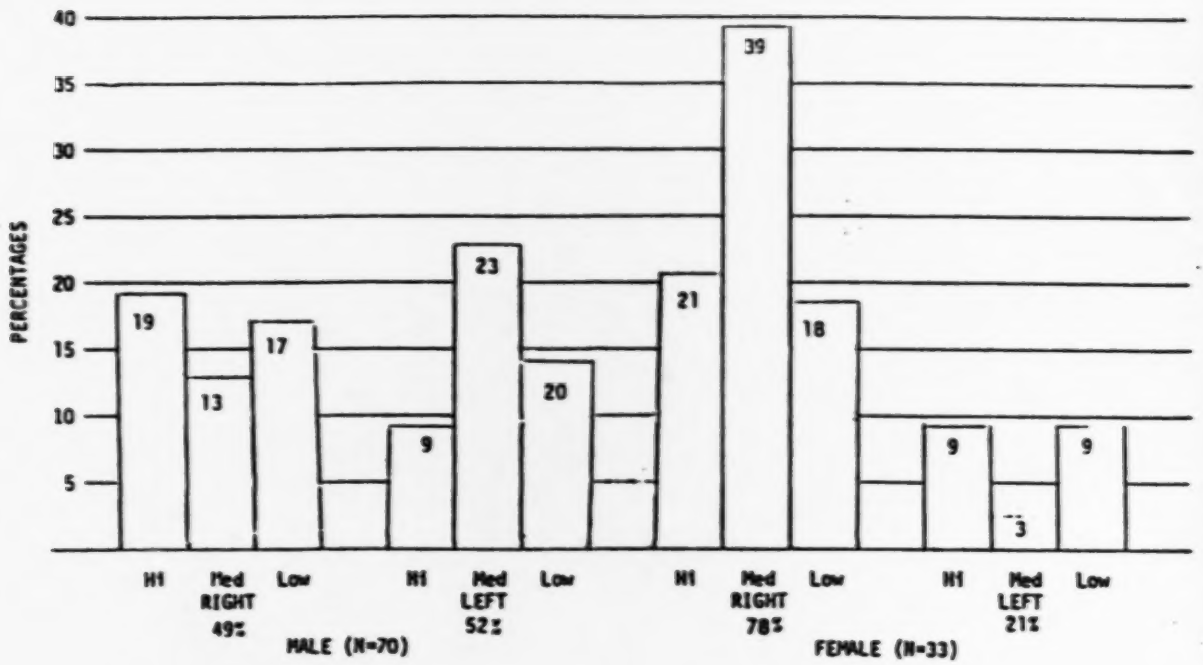

Figure 20: Frequency Distribution and Percentages of Male and Female Groups on Innovative Management Questionnaire by Brian Dominance.

Data in Figure 20 show that females were predominately right-brained (78 percent) and that males were approximately evenly distributed between right and left-brained (49 to 51 percent).

An almost equal percentage of right-brained/whole-brained males (19 percent) and females (21 percent) scored above 185 on the Perceived Innovation Questionnaire. Likewise, an almost equal percentage of right-brained females (18 percent) and males (17 percent) scored 155 or below on the PIQ. In the medium range (115 to 184), however, females exceeded males in right-brained dominance (males 13 percent; females 39 percent). A far higher percentage of left-brained males (20 percent) scored in the low level of the PIQ in contrast to 9 percent females. These data show a trend for right-brained females to score higher on this particular measurement of innovation (PIQ) than do right-brained males.

Elected/appointed superintendents. In analyzing this variable, the nominated superintendents were placed into one of two groupings: (1) elected or (2) appointed either by the school board or county court. Frequency distributions reveal that 16 superintendents were elected and 11 appointed . A t-test compared the left and right-brain scores of all superintendents relative to the method of superintendent selection. Compared also was the Total Score on the PIQ. Table XV presents the data from these analyses. As shown, elected superintendents did not significantly differ from appointed superintendents on any of the variables.

TABLE XV

T-TEST FOR ELECTED VS. APPOINTED SUPERINTENDENTS BY LEFT/RIGHT-BRAIN DOMINANCE AND INNOVATION AS MEASURED BY THE TOTAL SCORE OF PERCEIVED INNOVATION QUESTIONNAIRE (N=27) IN TENNESSEE, 1984

Superintendent Group	Number	Mean	Standard Deviation	Standard Error	Minimum	Maximum	t	df	Probability t
Variable - Right Brain									
Elected	16	77.12	18.27	4.57	49	121	-0.22	18.3	.82 ns
Appointed	11	79.00	22.90	6.90	45	112			
Variable - Left Brain									
Elected	16	128.00	8.80	2.20	113	142	-0.07	20.4	.94 ns
Appointed	11	128.27	9.59	2.89	114	141			
Variable - Total Score									
Elected	16	166.69	20.38	5.09	142	226	-0.43	11.9	.68 ns
Appointed	11	174.09	54.80	16.52	65	269			

City or county system/doctorate vs. non-doctorate. Frequency distributions and percentages were computed for these variables by considering perceived innovation as a high, medium or low score on the PIQ and viewing brain dominance as either one of the two clusters previously discussed (i.e., whole-brained/right-brained or left-brained/limbic). Figure 22 presents these data. Few differences exist between groups in relation to city/county status when comapring right or left dominance and percent scoring in high, medium or low categories.

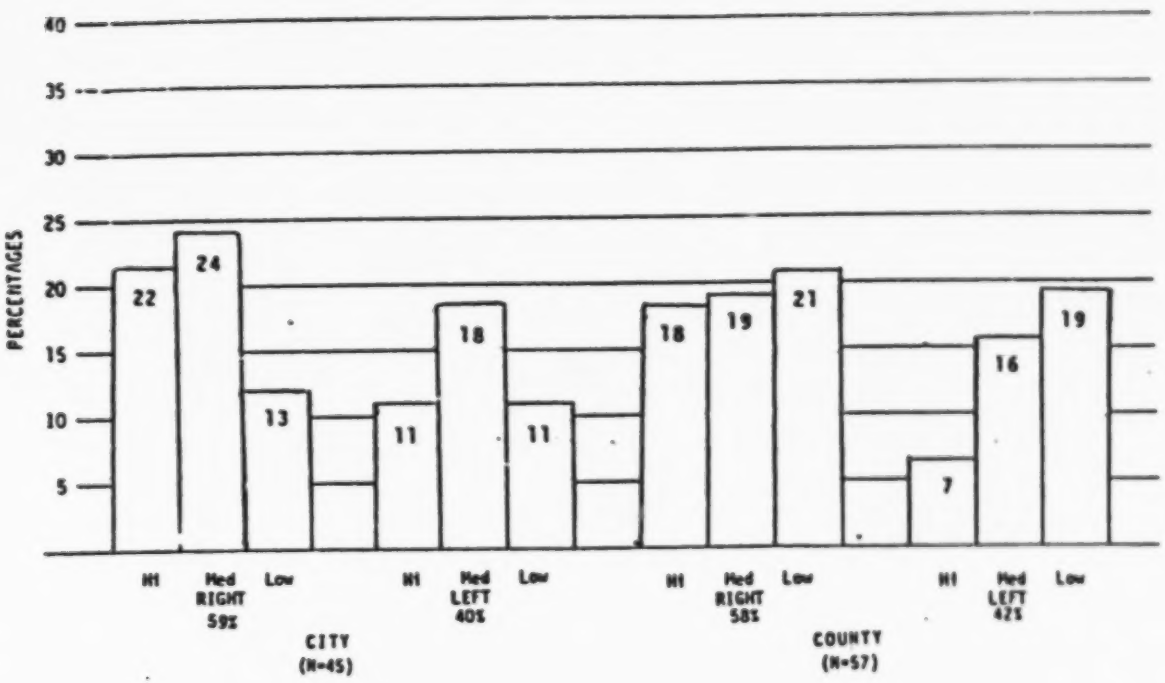

Figure 22: Percentages for Categories of City vs. County on High, Medium or Low Perceived Innovation Questionnaire Score Ranges by Brain Dominance.

NOTE: Due to rounding, groups may not equal 100%.

As demonstrated in Figure 23, those right-brained subjects (with doctorates) who scored in the high level on the PIQ outnumbered left-brained subjects by over 3 to 1 (28 to 9 percent). For non-doctorate subjects this ratio is not quite 2 to 1 (17 to 9 percent). The percentages are near equal for both groups when considering low scored on the PIQ (i.e., for doctorates 16 to 16 percent; non-doctorates, 18 to 17 percent).

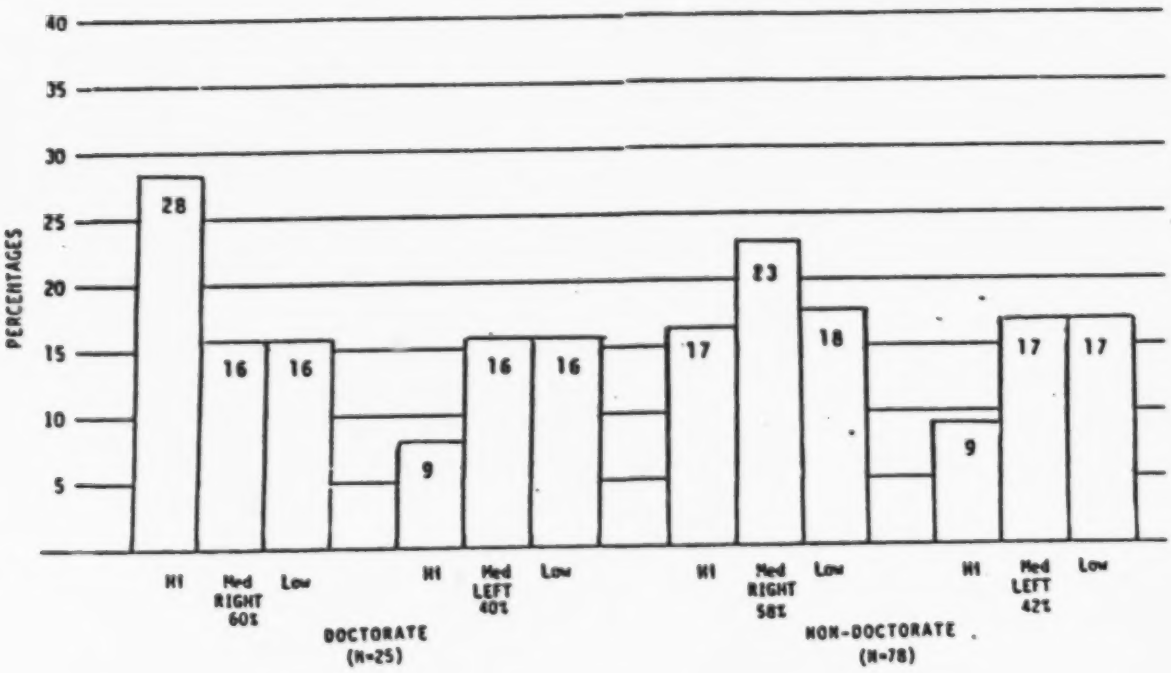

Figure 23: Percentages for Categories Doctorate vs. Non-Doctorate on High, Medium or Low Perceived Innovation Questionnaire Score Ranges by Brain Dominance.

NOTE: Due to rounding, groups may not equal 100%.

As shown in Figure 24, when considering all these levels of PIQ score ranges, the totals for both groups represent a move away from right-brain dominance as a system becomes smaller in size. In larger systems there is a 2 to 1 ratio of right-brained to left-brained people (68 percent to 32 percent); in middle sized systems it is almost a 2 to 1 ratio (66 percent to 34 percent); in small systems it is almost 1 to 1 (48 to 52 percent). When perceived innovation (PIQ) level is added, in systems a greater percentage of subjects scoring low on the PIQ are right-brained (36 percent large to 19 percent for medium systems and 7 percent for small) than in the smaller systems...

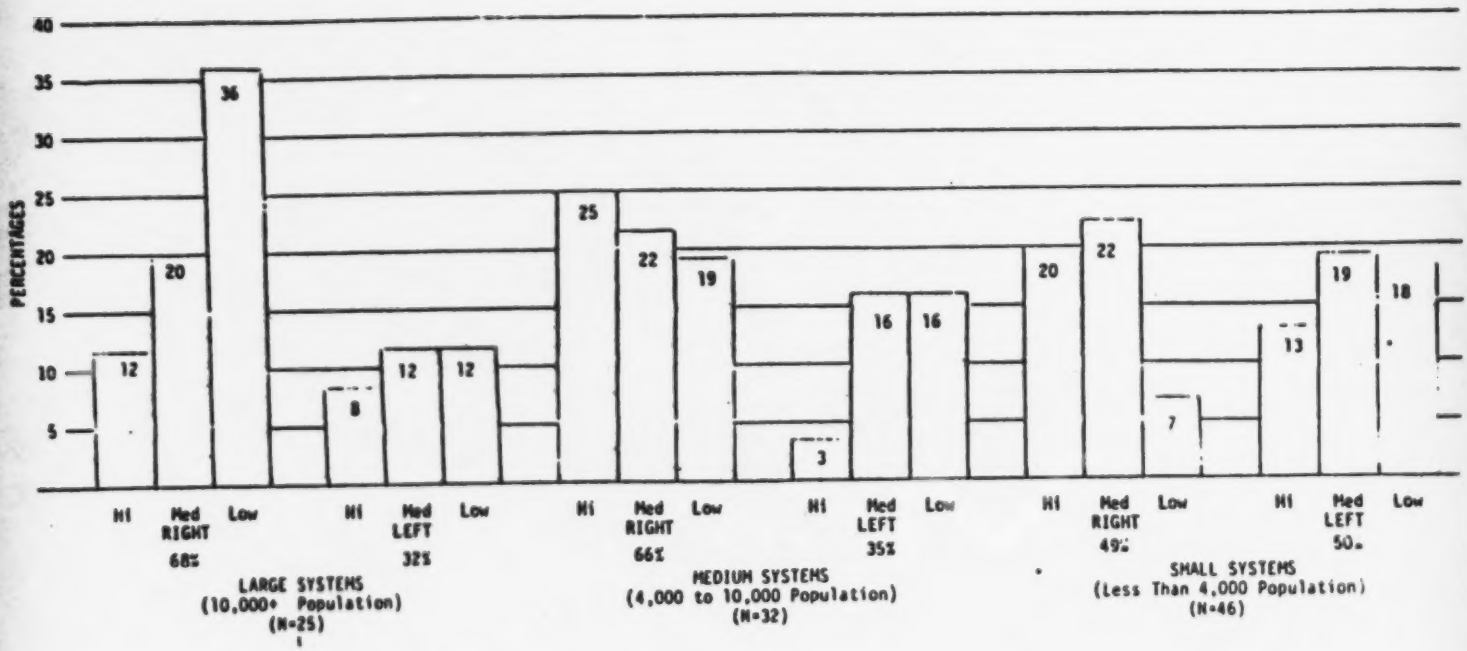

Figure 24: High, Medium and Low Score Ranges on Perceived Innovation Questionnaire by Brain Dominance (Right/Left) and System Size.

NOTE: Due to Rounding, groups may not equal 100%.

IV. CONCLUSIONS OF STUDY

Superintendents

This study suggests that the highest level of educational leadership, the superintendency, is dominated by individuals whose cognitive style is ineffective for conceptualizing visions of the future. Superintendents in this study, as measured by both their brain dominance patterns and their nomination ranking on the Katz management skills, appear unable to move beyond the analytical, technical aspects of their positions. Such findings reaffirm the earlier research of Ziegler (Schneidler: 1973:4) who pointed out that what superintendents generally want unfortunately for reformers and critics is "status quo" as well as the research of Coulson (1984) who found superintendents much less prone to conceptualizing and more analytical and safekeeping in their problem solving strategies than were high ranking leaders in industry.

These findings are in direct opposition to what Mintzberg (1976), Duigan (1980), Willis (1980), and others suggest are appropriate qualities for the position. These researchers characterized the superintendency as a position demanding spontaneous decision making, flexibility, and an ability to simultaniously sense the essence of a situation; thus demanding that judgements be made both intuitively as well as analytically.

Not only do the superintendents in this study demonstrate an inablility to formulate new directions, to conceptualize and to point the way; they appear equally prone to hold to the tried and true (as evidenced by their high scores in the lower left-brain quadrant denoted for a status quo orientation).

Such findings seem to reaffirm Dyer and Dyer's (1965) suggestion that the status quo, maintenance leader is threated by attempts to bring about change. All administrative efforts appear to be, as these authors suggest, "concerned with the prediction or achievement of known, predictable, measureable items or goals in accordance with familiar unchanging doctorines, procedures and methods" (p. 33).

Because of the crucial nature of education's current problems, the tendency of the superintendents in this study to think in a status quo vein could even further compound the system's need for change. Ohmae (1982) suggests that fear causes one to hold even tighter to the tried and true. As pressures increase, leaders often react with a "limited scope of vision that entraps deer on the highway" (p. 10). As public education is threatened and pressures increase will superintendents lean even more heavily upon their dominant left-brained nature? Will real progress be blocked in blind attempts to "safeguard" the educational system?

And what of the other administrative positions? Will those leaders operate any differently from superintendents; and how will superintendents, in turn, relate to their styles?

Principals

Principals, while still not as dominant in conceptual ability as might be desired, do appear to have a better balance between their analytical and conceptual modes of thought than do superintendents. This suggests that as a groups they have the potential for conceptualization as well the skills to insure the implementation of their ideas. This data is confirmed by the principal's highest ranking, among the groups in the study, on conceptual skills (36% ranked "1") as well as by their highest scores (among the groups) on the Perceived Innovation Questionnaire. Principals also had the highest scores (PIQ) among those who were also right-brained.

These findings paralleled the most recent research on the principal's role in promoting effective schools. As pointed out by Manasse (1984: 43) "Principals of successful schools have a vision of what their schools should be and of their role in achieving it." Manasse further suggests that "School districts must be prepared for the principals who may be "boat rockers," not satisfied to keep a low profile and maintain the status quo (p. 45). Findings from this current study of Tennessee administrators suggest that superintendents as leaders of school districts may, in fact, be quite unprepared for such boat rockers.

There is some question, based on the results of this research, if principals themselves will allow their creative potential to develop to the fullest extent if outside pressures from superintendents, school boards and otheres suggest that "refinement" of the established order is more appropriate. This is suggested by the lower left limbic scores of all school administreators being the most dominant of all scores on the brain profile. (Principals reflect a scaled score of 99 in this quadrant in contrast to a scaled score of 69 in the upper right quadrant characterized by creative, conceptual thought). Will such a tendency for maintanence prohibit principal's further advancement in the direction of change and improvement? And what of the 13% of principals who were whole brained in domianance (1111) as well as the 23% with a dominance pattern equal in both conceptual and maintanence qualities (1121)? If they are truly creative, will they, under pressure, leave the custodial organization; or will they become intimidated by those in power who may be more concerned with maintaining the status quo? Will they allow their potential to lie dormant and unused as a result of such pressure?

Supervisors

Of all administrative groups, supervisors appear to be strongest in their capacity for conceptualization as manifested by their right-brained scores. In addition 30% of this groups were given a ranking 1f "1" in conceptual skill which is comparable to the 36% of principals so ranked. Since this study has demonstrated a significant relationship between conceptualization and right-brain style, it would seem that the conceptualization skills of supervisors should be more visible. As Levitt suggests "Just getting ideas is not enough - one must implement them" (p. 10).

Supervisory PIQ scores ranked lowest of all administrative groups on Total Score mean when quantity of implementation was considered. However, when only Subtotal Score (which did not include a quantifiable measurement of innovation) was used, their scores were significant ($p. < .03$) when compared with brain dominance. This result suggests, that at least in thinking mode, they are the most innovative. Such conclusions pose the following quesitons:

1. Are supervisors hampered by their staff positions in their ability to implement change?

2. Do they hesitate to suggest ideas for change because of the uncertainity of their position rank?

3. Are supervisors too far removed from the real world of education by the safety and isolation of their central office positions?

4. Are supervisors (particularly the high percentage of women in this position) less willing to risk their first inroads into administration by suggesting innovations which might threaten the status quo?

Men vs. Women

Not only does there appear to be differences among administrative groups in this study but there are likewise differences related to male and female leaders. Women in this study were found to surpass men in the holistic approach which they bring to educational leadership. This is supported by their brain dominance patterns and suggested by the high Subtotal Scores which they recieved on the PIQ (women represent 79% of the subjects in the supervisors group whose PIQ Subtotal Scores were found to significantly relate to right-brain dominance ($p < .03$).

In this new age of maximizing human potential the time has come to allow women the increased opportunity to fill positions with line authority. It is the time, certainly, to take a renewed look at the wisdom of a traditional career path leading from building level principal to superintendent. Such a line of succession causes education to lose much of the potential for holistic leadership which this study has shown to be present among women. Can education afford to ignore such potential?

Concluding Remarks

What implications do the findings from this study have for today's superintendent? The results reaffirm the concept that it is the superintendent who is truly the Master of the Ship and the Molder of our Educational Destiny. It behoves each one to examine the fabric of his/her thoughts and to make the necessary modifications that will allow change to take place.

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APPENDIX A

BRAIN DOMINANCE MATERIALS

8-1-81

HERRMANN PARTICIPANT SURVEY FORM

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DIRECTIONS: Answer each question by writing the appropriate words or marking in the box or space provided. If an answer sheet is provided, use the answer sheet to record your answers for items 5 to 99.

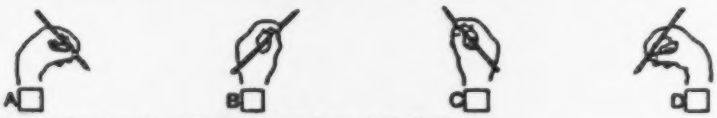
I. BIOGRAPHICAL INFORMATION

1. Name _____ 2. Sex: Male _____ Female _____
3. Educational Focus or Major _____
4. Occupation or Job Title _____

Describe the nature of your work _____

II. HANDEDNESS

5. Which picture most closely resembles the way you hold a pencil? Mark A, B, C, or D.



6. Strength and direction of your handedness: Mark A, B, C, D, or E.

A Primary Left | B Primary Left Some Right | C Both Hands Equal | D Primary Right Some Left | E Primary Right

III. BEST/WORST SUBJECTS

Thinking back to your best/worst subjects in elementary or secondary school please rank the following subjects with a 1, 2, or 3 on the basis of how well you did. Rank all three subjects; 1 is best, 2 is second, 3 is third best. Record your ranks in the boxes, and on the answer sheet, if it is provided.

☐ 7. Math ☐ 8. Foreign Language ☐ 9. English

IV. WORK ELEMENTS

Indicate your response to each of the work elements below using the following key:

5 = Work I do best of all
4 = Work I do well
3 = Neutral
2 = Work I do poorly
1 = Work I do worst of all

10. ___ Analytical
11. ___ Administrative
12. ___ Conceptualizing
13. ___ Expressing Ideas
14. ___ Integration
15. ___ Writing
16. ___ Technical Aspects
17. ___ Implementation
18. ___ Planning
19. ___ Interpersonal Aspects
20. ___ Problem Solving
21. ___ Innovating
22. ___ Teaching/Training
23. ___ Organization
24. ___ Creative Aspects
25. ___ Financial Aspects

V. KEY DESCRIPTORS

Select the eight adjectives which best describe the way you see yourself and mark a "2" by each. Then change a single "2" to a "3" for the adjective which best describes you. Mark the seven "2's" and one "3" on your answer sheet, if it is provided.

26. ___ Logical
27. ___ Creative
28. ___ Musical
29. ___ Sequential
30. ___ Synthesizer
31. ___ Verbal
32. ___ Conservative
33. ___ Analytical
34 ___ Detailed
35. ___ Emotional
36. ___ Spatial
37. ___ Critical
38. ___ Artistic
39. ___ Spiritual
40. ___ Rational
41 ___ Controlled
42 ___ Mathematical
43. ___ Symbolic
44. ___ Dominant
45. ___ Holistic*
46. ___ Intuitive
47. ___ Quantitative
48. ___ Reader
49. ___ Simultaneous
50. ___ Factual

* (Can see the forest as contrasted with the trees.)

VI. HOBBIES

Indicate all hobbies you are actively engaged in by marking a "3" for your major hobby, "2" for primary hobbies and "1" for your secondary hobbies.

51. ___Arts/Crafts
52. ___Boating
53. ___Camping/Hiking
54. ___Cards
55. ___Collecting
56. ___Cooking
57. ___Creative Writing
58. ___Fishing
59. ___Gardening/Plants
60. ___Golf
61. ___Home Improvements
62. ___Music/Listening
63. ___Music/Playing
64. ___Photography
65. ___Reading
66. ___Sailing
67. ___Sewing
68. ___Spectator Sports
69. ___Swimming/Diving
70. ___Tennis
71. ___Travel
72. ___Wood Working
(other)_____

VII. ENERGY LEVEL

73. Thinking about your energy level or "drive", SELECT the ONE which best represents you. Mark A, B, or C.

A☐ "Day Person" B☐ "Day/Night" Equally C☐ "Night Person"

VIII. MOTION SICKNESS

74. Have you ever experienced motion sickness (nausea, vomiting) in response to any kind of vehicular motion (such as car, boat, plane, bus, train, amusement ride)? Number of times: Mark A, B, C, or D.

A☐ None B☐ 1-2 C☐ 3-10 D☐ More than 10

75. Can you read while traveling in a car without stomach awareness, headache, nausea or vomiting? Mark A or B.

A☐ Yes B☐ No

IX. ADJECTIVE PAIRS

Which word or phrase in each pair is more descriptive of yourself? Mark only A or B even if the choice is a difficult one. Do not leave any questions unmarked.

	Column A	Column B		Column A	Column B
76.	☐ Conservative	☐ Empathetic	88.	☐ Imaginative	☐ Sequential
77.	☐ Analyst	☐ Synthesizer	89.	☐ Original	☐ Reliable
78.	☐ Quantitative	☐ Musical	90.	☐ Creative	☐ Logical
79.	☐ Problem Solver	☐ Planner	91.	☐ Controlled	☐ Emotional
80.	☐ Controlled	☐ Creative	92.	☐ Musical	☐ Detailed
81.	☐ Original	☐ Emotional	93.	☐ Simultaneous	☐ Empathetic
82.	☐ Feeling	☐ Thinking	94.	☐ Communicator	☐ Conceptualizer
83.	☐ Interpersonal	☐ Organizer	95.	☐ Technical Things	☐ People Oriented
84.	☐ Spiritual	☐ Creative	96.	☐ Well Organized	☐ Logical
85.	☐ Detailed	☐ Holistic	97.	☐ Rigorous Thinking	☐ Metaphorical Thinking
86.	☐ Originate Ideas	☐ Test & Prove Ideas	98.	☐ Like Things Planned	☐ Like Things Mathematical
87.	☐ Warm, Friendly	☐ Analytical	99.	☐ Technical	☐ Dominant

X. EXTROVERSION/INTROVERSION

100. Where would you place yourself on this scale? Mark an "X" on the scale between extrovert and introvert.

EXTROVERT ——— INTROVERT

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HERRMANN 20 QUESTIONS

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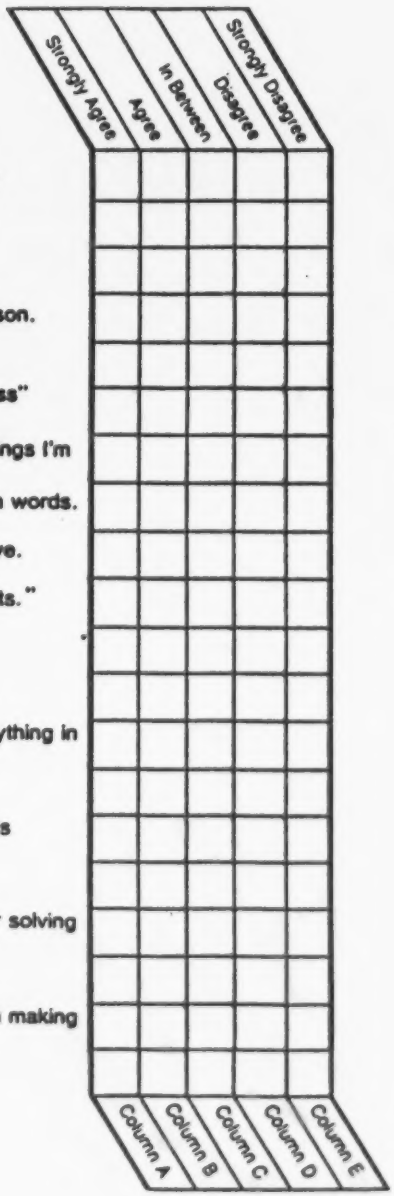
Name _____

DIRECTIONS: Answer each question by marking an "x" in the appropriate column. If an answer sheet is provided, use the answer sheet to record your answers.



1. I feel that a step-by-step method is best for solving problems.
2. Daydreaming has provided the impetus for many of my more important problems.
3. I like people who are most sure of their conclusions.
4. I would rather be known as a reliable than an imaginative person.
5. I often get my best ideas when doing nothing in particular.
6. I rely on hunches and the feeling of "rightness" or "wrongness" when moving toward the solution to a problem.
7. I sometimes get a kick out of breaking the rules and doing things I'm not supposed to do.
8. Much of what is most important in life cannot be expressed in words.
9. I'm basically more competitive with others than self-competitive.
10. I would enjoy spending an entire day "alone with my thoughts."
11. I dislike things being uncertain and unpredictable.
12. I prefer to work with others in a team effort rather than solo.
13. It is important for me to have a place for everything and everything in its place.
14. Unusual ideas and daring concepts interest and intrigue me.
15. I prefer specific instructions to those which leave many details optional.
16. Know-why is more important than know-how.
17. Thorough planning and organization of time are mandatory for solving difficult problems.
18. I can frequently anticipate the solutions to my problems.
19. I tend to rely more on my first impressions and feelings when making judgements than on a careful analysis of the situation.
20. I feel that laws should be strictly enforced.

Brain Dominance
Scoring Worksheet

	Left L	Lower Left LL	Lower Right LR	Right R
Scores Using Overlay Scoring Keys				
Side 1 PS				
Side 2 PS				
20 Questions	X		X	
Scores Using Tables 1, 2, and 3				
Best/Worst Subj. (10 pts.)				
Occupation (8 points)				
Educ. Major (6 points)				
Raw Score Totals (Sum numbers in columns)				
Scaled Score (Multiply Raw Score Total by 1.5, or see Table 4)				
Profile code (e.g. 1232) from scale scores 67 to 100 = 1; 34 to 66 = 2 2 to 33 = 3				
Total Left and Right				

Total Left Score (Left Plus Lower Left Raw Score)

Total Right Score (Right Plus Lower Right Raw Score)

MEMO CAPTURE of ADJECTIVE PAIR DATA	L	L/L	L/R	R

NAME _____

ADDRESS _____

HERRMANN BRAIN DOMINANCE CONSOLIDATED SCORE SHEET

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GROUP _____

OCCUPATION _____

MALE _____ FEMALE _____

100 95 90 85 80 75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100

Left Hemisphere Dominance

Right Hemisphere Dominance

KEY DESCRIPTORS

Analytic	Logical	Mathematical	Rational	Critical	Quantitative	Factual	Conservative	Controlled	Sequential	Detailed	Dominant	Verbal (Articulate)	Risk (Technical)	Feeler (Personal)	Verbal (Talker)	Intuitive (Feelings)	Symbolic	Spiritual	Musical	Emotional	Spatial	Simultaneous	Synthesizer	Holistic

Intuitive (Solutions)	Artistic	Creative																						

WORK ELEMENTS

Analytical	Technical Aspects	Problem Solving	Financial Aspects	Organization	Planning	Administrative	Implementation	Teaching/ Training	Writing	Expressing Ideas	Interpersonal Aspects	Integration	Conceptualizing	Creative Aspects	Innovating									

BEST/WORST SUBJECTS	Math			Math/Foreign Language			Foreign Language			English/Foreign Language			English											
EDUCATIONAL MAJOR	L			LL			C			LR			R											
OCCUPATION	L			LL			C			LR			R											
HOBBIES	L			LL			C			LR			R											
LANGUAGE CENTER	Left						Distributed						Right											
HANDEDNESS	Strong Right			Strong Right/Some Left			Mixed			Strong Left/Some Right			Strong Left											
MOTION SICKNESS				I			II			III			IV			V								
ENERGY LEVEL	Day						Equal						Night											
ADJECTIVE PAIRS		Left			Lower Left					Lower Right			Right											
TOTAL SCALE SCORES																								

INTROVERT/EXTROVERT	Introvert																							Extrovert

8-1-81

APPENDIX B

PERCEIVED INNOVATIVE MATERIALS

77

PERCEIVED INNOVATION QUESTIONNAIRE

NAME_____ POSITION_____

This questionnaire is designed to evaluate the management styles of three separate groups: superintendents, principals and supervisors. Please answer each question in relation to your particular position.

PLACE THE NUMERAL PERTAINING TO THE APPROPRIATE RESPONSE ON THE BLOCK ON THE RIGHT.

1. a) Indicate the size of your school system.

1 = 1,000 - 4,000
2 = 4,000 -10,000
3 =10,000 -40,000
4 = over 40,000 a)____

b) How many teachers and/or administrators do you supervise?

1 = less than 50
2 = 50 - 200
3 = over 200 b)____

THE FOLLOWING QUESTIONS REFER TO SIGNIFICANT CHANGES WHICH HAVE OCCURRED IN YOUR SCHOOL SYSTEM DURING THE PAST FIVE YEARS. A SIGNIFICANT CHANGE IS DEFINED AS AN ALTERATION OF, ELABORATION OF, OR COMPLETELY NEW POLICY, PROCEDURE, OR PROGRAM WHICH HAS IMPACTED UPON AN AREA OF EDUCATIONAL CONCERN WITHIN YOUR LEA.

2. a) Have such changes occurred in your system?

1 = yes 2 = no a)____

b) How many changes have occurred?

1 = 1 - 3
2 = 3 - 5
3 = 6 - 8
4 = 9 - 11
5 = more than 12 b)____

c) How many were the result of your own "visionary planning", or ability to conceptualize and establish goals?

1 = none
2 = 1 - 3
3 = 3 - 5
4 = 6 - 8
5 = 9 - 11
6 = more than 12 c)____

d) Estimate the number of significant changes which resulted from your subordinates ideas.

1 = none
2 = 1 -3
3 = 3 - 5
4 = 6 - 8
5 = 9 - 11
6 = more than 12 d)____

3. Do your subordinates work with you in formulating an operational plan for the area you supervise?

1 = yes 2 = no ____

4. Indicate which of the following are included by design and budget in your operational plan.

1 = included 2 = not included

a) hiring & training of new personnel a)____
b) plant expansion b)____
c) curriculum development c)____
d) new equipment purchases d)____
e) training & development in new methods/materials e)____
f) population expansion (i.e. pre school,adult education) f)____
g) public relations g)____

5. In assisting the organization in formulating new goals and directions which of the following do you attempt to identify?

1 = identified 2 = not identified

a) population trends a)____
b) economic conditions b)____
c) political developments c)____
d) educational trends d)____
e) funding sources e)____
f) social trends f)____
g) research breakthroughs g)____
h) other, specify_____ h)____
_____

6. a) In determining new directions, on which of the following do you rely? (List all that apply).

1 = formal needs assessment a)____
2 = intuitive sense of what is needed ____
3 = recommendations of personnel closest to contemplated change ____
4 = other, specify._____ _____ ____
_____

b) Which of the above do you consider of most importance? b)____

7. What percentage of your operating budget is devoted to the following? (Use the indicated scale for all categories).

1 = 0 - 5%
2 = 6 - 10%
3 =11 - 16%
4 =17 - 22%
5 = over 23%

a) new projects a)____
b) consultants b)____
c) travel c)____
d) inservice training d)____

8. a) Do you encourage the use of outside consultants to stimulate new ideas?

1 = yes 2 = no a)____

b) If yes, what is your primary consultant source?

1 = state department personnel
2 = university staff
3 = consulting organizations
4 = free-lance individuals b)____

9. a) Do you provide opportunities for your staff to share ideas with individuals in similar positions in other localities?

1 = yes 2 = no a)____

b) If yes, which ranges of peer contact do you encourage?

1 = county wide ____
2 = state wide ____
3 = national ____

10. a) Are you an <u>active</u> member of professional growth organizations?

1 = yes 2 = no a)____

b) If yes, to how many local and state organizations do you belong?

1 = 1 - 3
2 = 4 - 6
3 = 7 or more b)____

c) To how many national organizations do you belong?

1 = 1 - 2
2 = 3 - 4
3 = 5 or more c)____

11. a) Do you encourage professional membership among your subordinates?

1 = yes 2 = no a)____

b) Estimate the percentage of your subordinates who belong to more than three state and national organizations.

1 = less than 25%
2 = 25% - 50%
3 = more than 50% b)____

12. At the time of hiring, what percentage of your current staff, for whom you made employment decisions, were local residents?

1 = 50% or less
2 = 60% - 70%
3 = 80% - 90%
4 = 100% ____

13. How long have you been in your current position?

1 = 0 - 2 years
2 = 3 - 5 years
3 = 6 - 8 years
4 = 9 - 12 years
5 = 13 years or more ____

14. How would you describe your particular management style?

1 = more innovative than conservative
2 = more conservative than innovative ____

15. How would your peers and/or subordinates describe your management style?

1 = more innovative than conservative
2 = more conservative than innovative ____

16. Consider the school system, building, or department under your direct supervision. What significant changes (as defined in page one of this questionnaire) have occurred there as the direct result of your initiatory efforts? Indicate the degree of change that has resulted in each area listed below by placing a numeral (3-0) under the column marked "change". Signify the importance of each change to you by placing a numeral (3-0) under the column labeled "importance".

Response	3	2	1	0
Change	Significantly Changed	Moderately Changed	Slightly Changed	No Change
Importance	Extremely Important	Moderately Important	Slightly Important	No Importance

	Change	Importance
I. External Environment		
Parental Involvement	____	____
Community Relations	____	____
Media Support	____	____
Interagency Cooperation	____	____
Industrial Coordination	____	____
Support of Professional Groups	____	____
Funding Sources	____	____
Relationships with State & Federal Agencies	____	____
II. Curriculum Content		
Basic Skill Acquisition	____	____
Higher-Level Thinking Processes	____	____
Affective Development	____	____
Social Responsibility	____	____
Futuristics/Problem Solving	____	____
III. Educational Process		
Teaching/Learning Styles	____	____
Instructional Technology	____	____
Student Evaluation & Accountability	____	____
IV. Professional Growth		
Staff Development	____	____
Professional Standards	____	____
Wage & Salary Considerations	____	____
Opportunities for Advancement/Significant Contributions	____	____

General Comments: _____

(5)

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References

Perceived Innovation Questionnaire

Sources Used in the Development of the Questionnaire

Question I:
Classification only.

Question II a and b:
Owens (1970); House (1974); Harris (1976); Firestone (1977); Hall (1982); Hodgkinson (1982); Paulson (1982).

Question IIc:
Culbertson (1976); Zaleznick (1977); Mintzberg (1975); Ouchi (1981); Pascale and Athos (1981); Peters (1981).

Questions II d and III:
Osborn (1957); Morphet (1967); Heichberger (1976); Hertzbert (1971); Burns (1978); Maccoby (1981).

Question IV:
Survey of Tennessee public school's educational budget categories.

Question V:
Argyris (1957); Lewin (1958); Gallaher (1965); Zander (1966); Chin and Benne (1967); Owens (1970); Jalango (1978); Bateman (1980).

Question VI:
Rowan (1979); Raudsepp (1981); Dede and Allen (1981).

Question VII:
Refer to question #IV.

Question VIII a and b:
Lippitt (1958); Havelock (1973); Achilles and Norman (1975).

Question IX:
Rogers (1965); Jalango (1978).

Questions X and XI:
Carlson (1965).

Question XII:
Carlson (1965); Rogers (1971).

Section IV, Items 1-4:
Miles (1965); Klein (1967); Watson (1967); Chin (1967); Orlasky and Smith (1972); Rutherford (1978); Dede and Allen (1981).

SCORING KEY

I. Innovation in current position

Question	High (3)	Flexible (2)	Moderate (1)
2(c)	answers 4,5,or 6	2 or 3	1
4	all items	5 - 7	less than 5 items = 1
5	7 or 8 items	5 or 6 items	less than 5 items = 1
6(a)	3 - 4 items	2 -4 items	less than 2 items
(b)	#2	#1 and 3	#1 only
7(a)	#4 - 5	#2 - 3	#1
(b)	2 - 5		#1
(c)	4 - 5	#2 - 3	#1
(d)	4 - 5	#2 - 3	#1
8(a)	#1		#2
(b)	#3 or 4	#2	#1
9(a)	#1		#2
(b)	#1,2,3	#1,2	#1
11(a)	#1		#2
(b)	#3	#2	#1
12	#1	#2 or 3	#4
15	#1		#2

II. Involvement of others in the organization in innovation and new directions	(20 points) HIGH	(10 points) FLEXIBLE	(5 points) MODERATE
Question			
2(d)	#3 - 6	#2	#1
3	#1		#2
6(a)	#1,3,2	#1 + 3	#1
(b)	#3	1	#1
9(a)	#1.		#2
(b)	#3 must be included	#1 and 2	#1
11(a)	#1		#2
(b)	#3	#2	#1

III. Innovative "tone" in personality	(20 points) HIGH	(10 points) FLEXIBLE	(5 points) MODERATE
6(a)	#2	#1 or 3	#1
(b)	#2	#3	#1
10(a)	#1		#2
(b)	#3	#2	#1
(c)	#3	#2	#1
13	#1 or #2	#3 or #4	#5
14	#1		#2

IV. Innovative Results

Question 16(a): Amount of Change	3 points HIGH	2 points FLEXIBLE	1 point MODERATE	0 points IMPOVERISHED

score _____

TOTAL _____

(b) Personal Importance attached to change	3 points HIGH	2 points FLEXIBLE	1 point MODERATE	1 point IMPOVERISHED

score _____

TOTAL _____

APPENDIX C

NOMINATION MATERIALS

PRINCIPAL

LEADERSHIP

NOMINATION FORM

Directions: Using the numerals 1,2,3, rank each nominee according to: technical, human, and conceptual skill. (Use each numeral only once).

	NAME	T.	H.	C.	SCHOOL SYSTEM
1.	_____	—	—	—	_____
2.	_____	—	—	—	_____
3.	_____	—	—	—	_____
4.	_____	—	—	—	_____
5.	_____	—	—	—	_____
6.	_____	—	—	—	_____
7.	_____	—	—	—	_____
8.	_____	—	—	—	_____
9.	_____	—	—	—	_____
10.	_____	—	—	—	_____
11.	_____	—	—	—	_____
12.	_____	—	—	—	_____
13.	_____	—	—	—	_____
14.	_____	—	—	—	_____
15.	_____	—	—	—	_____
16.	_____	—	—	—	_____
17.	_____	—	—	—	_____
18.	_____	—	—	—	_____
19.	_____	—	—	—	_____
20.	_____	—	—	—	_____